Workshop Manual

SpaceFox, Space Cross, Suran, Suran Cross, Sportvan 2006 ➤

Running gear, axles, steering

Edition 05.2011

Service

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Repair Group

Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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Contents

00 – Technical data

1 Assessment of vehicles involved in accidents

During steering and suspension component repairs on crashed vehicles, there may exist unidentified damages on the frame. Later these unidentified damages may cause serious consequences. If the vehicle geometry measurement does not indicate any difference related to nominal values, this means there is no frame deformation. Regardless of checking the vehicle geometry, the following components are checked on the sequence and as indicated.

Visual and operation check of the steering system

- Check visually for deformities and cracks
- Check clearances in the steering bar articulation and in the steering mechanism
- Check electrical wires, hydraulic system tubes, and flexible tubes for wear, cuts, or folds
- Check the tightness of hydraulic system tubes, threaded units and steering box
- Check the correct seating of the steering box and the tubes
- Check the correct operation of the steering system, making the steering wheel travel all the way, from stop to stop. Applying the same force, the steering wheel should turn with no pressure

Visual check for operation of the frame

- check all components represented in the assembly scheme for deformations, cracks or other damages
- always replace the damaged components
- Check vehicle geometry in an equipment certified by "VOLKSWAGEN"

Visual check of wheel and tire operation

- Check for uniformity and any deformations. Refer to: ⇒ Running gear, axles, steering; Rep. Gr. 44 ; Wheels, tires, vehicle measurement
- Check the tires for cuts and damage to threads and flanks. Refer to: ⇒ Running gear, axles, steering; Rep. Gr. 44 ; Wheels, tires, vehicle measurement
- Check tire pressure; see tire pressure tag on fuel cover or on the manual ⇒ Maintenance ; Booklet

In case of damages to the rim and/or tire, replace the tire. The same is applicable when crash and damage on the vehicle indicate rim damage, even though they are invisible.

Another criterion is the age of the tires: tires shall not be older than 6 years.

In case of doubt:

- If a safety risk cannot be eliminated, the tire(s) must be replaced

Vehicle general condition:

Also check other vehicle systems, such as:

- Braking system, including ABS
- Exhaust and protection system for passengers through visual and operation checking

Checking and adjustment values, and notes on the issue are included in the respective Repair Manual/ELSA.

The checking described herein, related to crashed vehicles, refers only to the chassis and is not intended to be comprehensive for the entire vehicle.

Electronic vehicle systems:

Safety-relevant systems such as, e.g.: ABS/EDS, airbag, electronically controlled power steering systems; electromechanical; electrohydraulic steering and other driver assistance systems must be checked using the Diagnosis, Measurement and Information System -VAS 5052-- for eventual faults. In case there are any inconsistencies in the fault memory of these systems, proceed to repair according to the instructions described in the Workshop Manual or ELSA. After finishing the repair, check the systems for any faults again in order to ensure the correct operation of the related device.

2 Technical data

2.1 Frame

Model		All
Distance between axles	mm	2464
Unloaded axle bore	mm	1418 front 1408 rear
Vehicle turning radius: Power steering box	m	 11,25

2.2 Steering

Model	All
Steering wheel turns from stopper to stopper	2,90

2.3 Wheels, tires

General information on wheel/tire sets, winter tires, snow chains or other recommended types of tires can be found in chapter Wheels, tires, vehicle measurement.

40 – Front suspension

1 Front suspension - repair

Note

When replacing components with metal and rubber supports, or when screws/nuts have been removed from such components, you must lift the unloaded axle before tightening ⇒ page 5 .

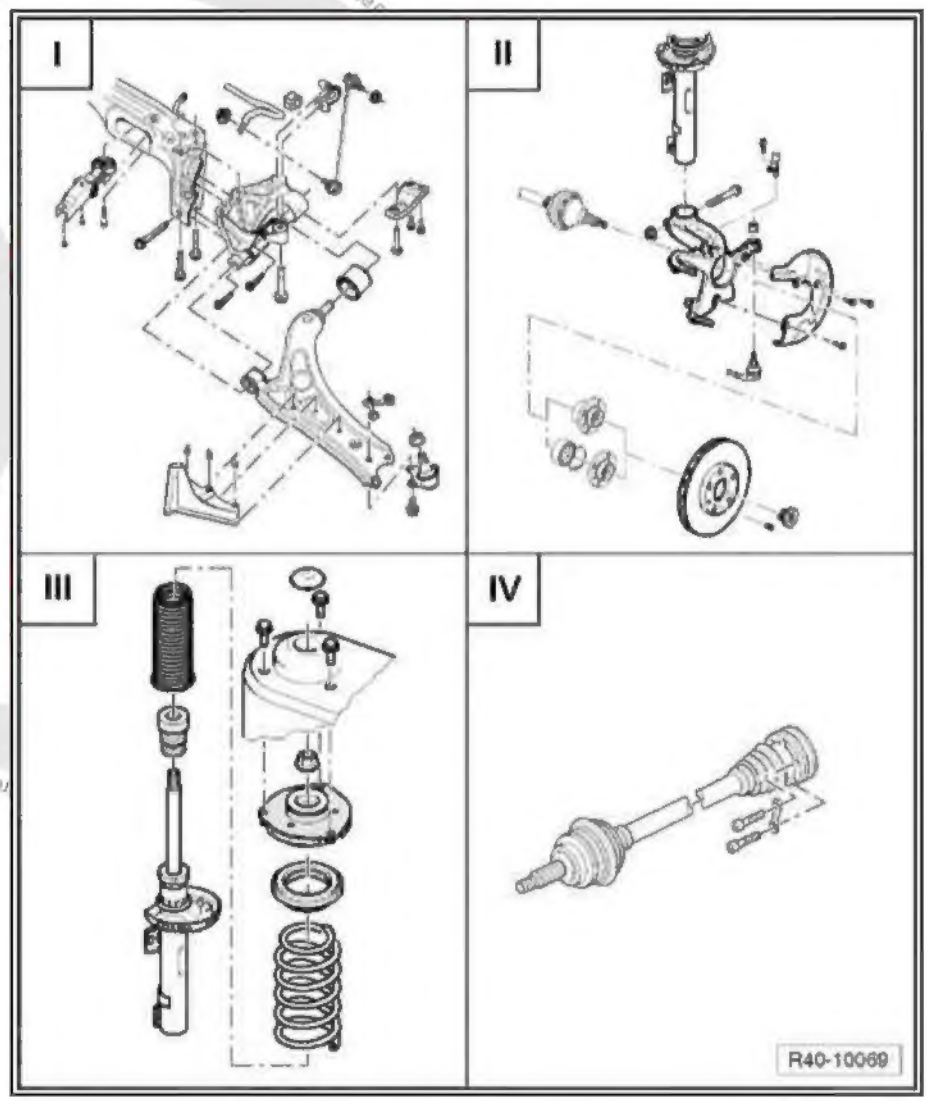
1.1 Front suspension - assembly overview

I - Sub-frame, anti-roll bar and wishbone - assembly overview ⇒ page 7

II - Wheel roller bearings - repair ⇒ page 27

III - Front suspension strut - assembly overview ⇒ page 46

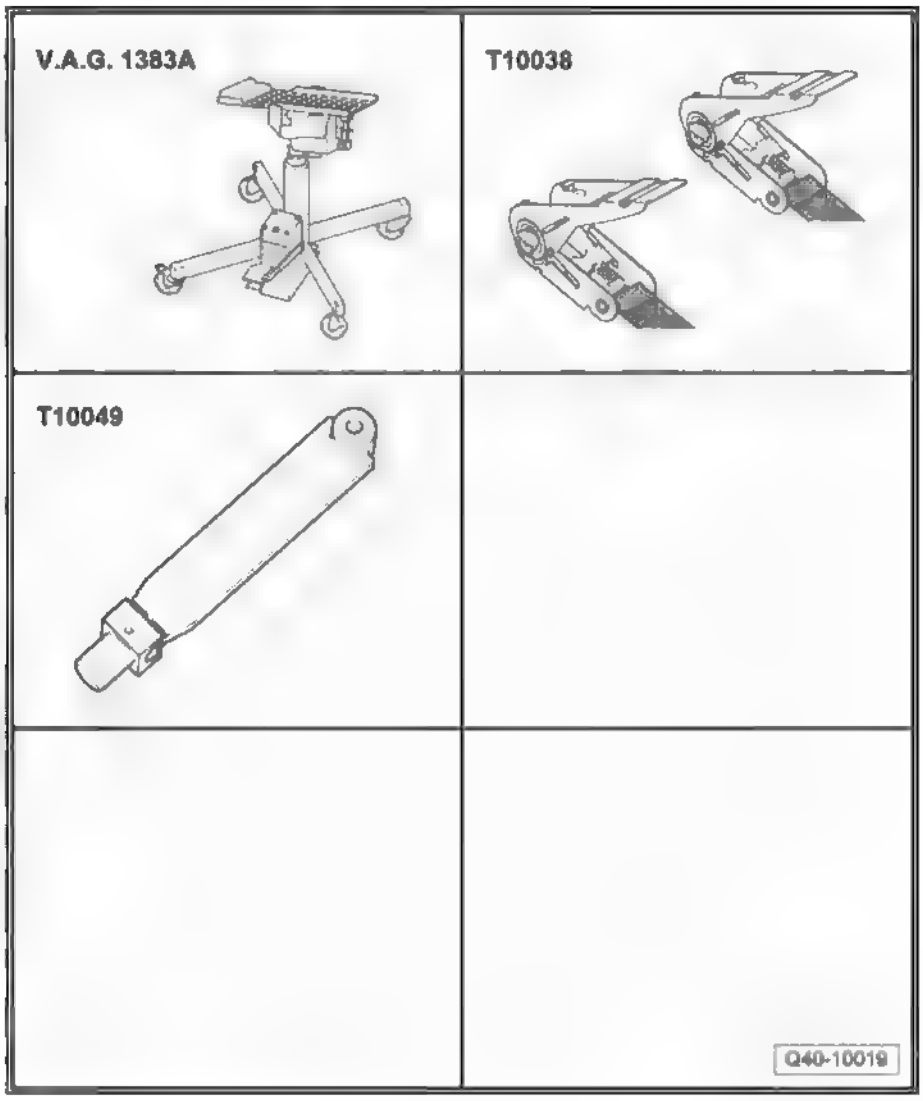
IV - Drive shafts with constant-velocity joints - repair ⇒ page 58



1.2 Lift the rear axle in the unladen position

Special tools and workshop equipment required

- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-
- Tension belt -T 10038-
- Support -T 10149-



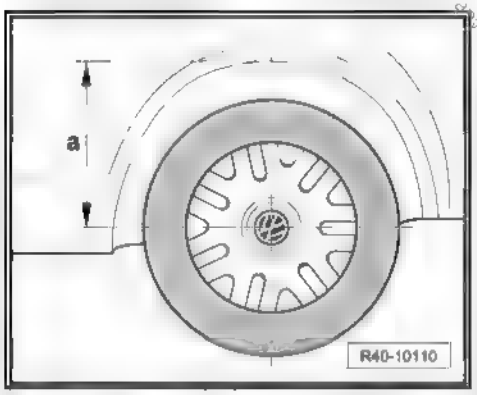
All screws on running gear's components with metal rubber bearings must always be tightened with the vehicle in unladen position.

The metal-rubber bearings must have limited torsion area. Therefore, the axle components with metal-rubber bearings must be placed in running position before tightening (unladen vehicle).

Otherwise, the metal-rubber bearings would become deformed and, consequently, their work life would be reduced.

We can simulate this suspension position in the lift with the aid of the Tray for engine jack EQ 7081 -VAG 1359/2- and Support -T10149- .

Before servicing it, the distance shall be measured using a measuring tape
-nd- from the wheel centre to the wheel housing lower edge shall be measured using a measure tape.



Note

- *The measurement must be performed with the vehicle unladen)*
- *Take notes on the measured value. This will be required for tightening the screws/nuts.*

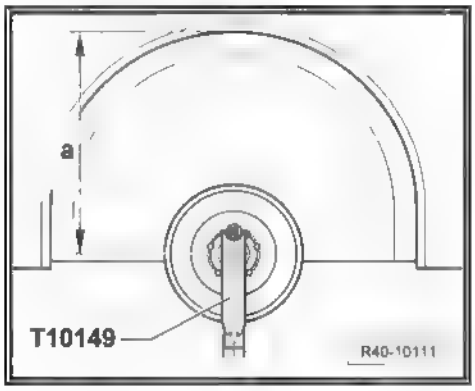
Before lifting the vehicle, you must fasten it to the supporting arms in the lift with the help of the Tension belt -T10038-

If the vehicle is not fastened, there is a danger of it shifting from the lift

– Turn the wheel until one of its screw hole is at upper position.
– Fasten the Support -T10149- with the wheel screw.

The required screws and nuts tightening should only be done when the distance -nd- between the wheel hub centre and the wheel housing lower edge is the same measurement as the previous one

– Lift the rear axle with the hydraulic jack until the dimension -nd- has been reached.



WARNING

- *Do not lift or lower the vehicle if the engine jack is placed under the vehicle.*
- *Do not leave the hydraulic jack below the vehicle longer than necessary.*

– Tighten the necessary screws and nuts.
– Remove the engine jack.
– Remove the Support -T10149- .

2 I - Sub-frame, anti-roll bar, and wishbone - assembly overview

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

Note

- *Soldering and straightening works are not permitted in supporting components from the suspension or in components located on the wheels*
- *Always replace corroded screws/nuts*

1 - Subframe
- ❑ different versions
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)
- ❑ Remove and install ⇒ page 22

2 - Hexagon nut
- ❑ 40 Nm

3 - Anti-roll bar
- ❑ The subframe must be lowered to remove and install

4 - Rubber support

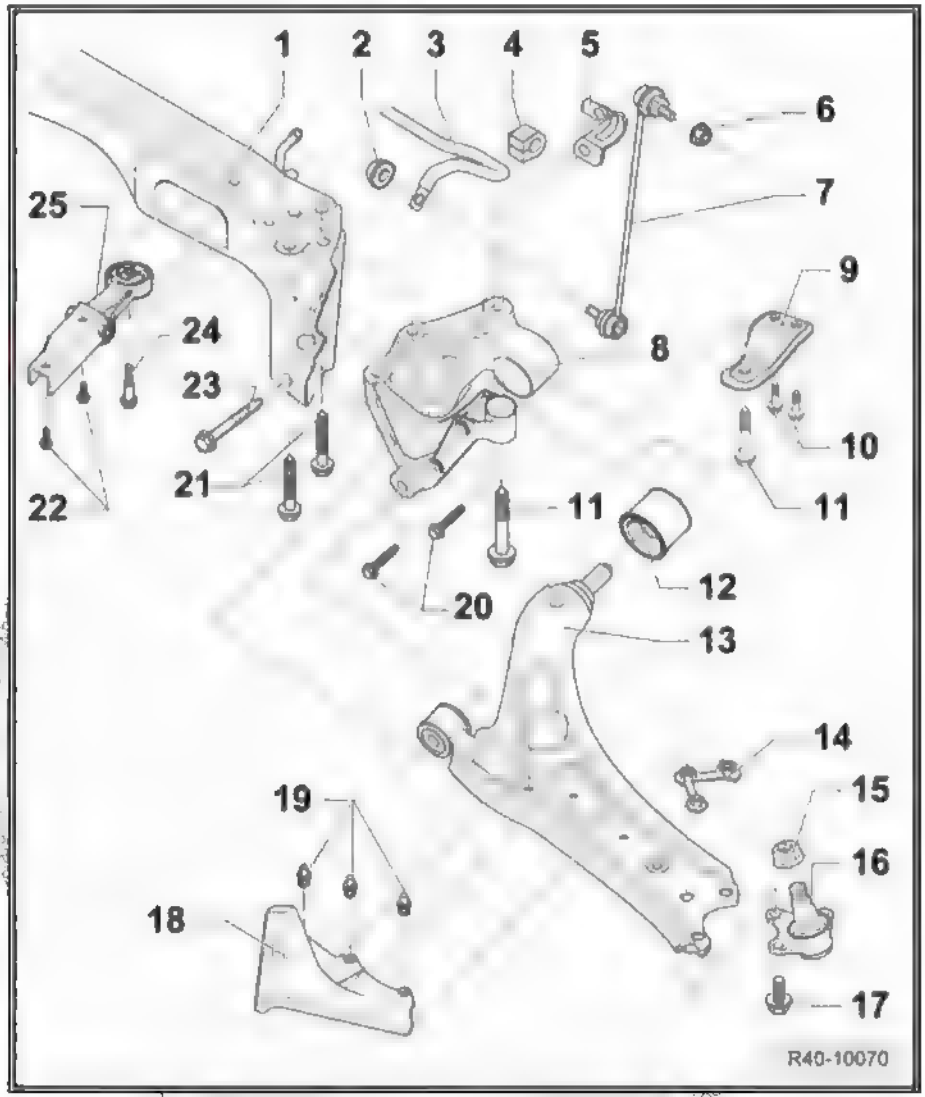
5 - Clamp

6 - Hexagon nut
- ❑ only vehicles with power steering
- ❑ 40 Nm

7 - Coupling rod
- ❑ only vehicles with power steering
- ❑ Between the stabilizer and suspension pillar

8 - Subframe console
- ❑ Remove and install ⇒ page 16

If the console thread is damaged, it can be repaired with a Heli-Coil thread insert
- ❑ To do so, drill the hole with a ∅ 12 mm drill bit.



WARNING

When drilling, make sure to not perform an inclined hole drilling

Should the hole be drilled in oblique angle, the console shall be replaced

Should the hole was drilled correctly, proceed with the operation according to the procedure described in the VAS thread repair set ⇒ page 9

9 - Support

10 - Hexagon screw
- ❑ 20 Nm + 90°
- ❑ Replace after each removal

If the soldered nut thread is damaged, it can be repaired with a Heli-Coil thread insert

Servicing thread in longitudinal member ⇒ page 9

11 - Hexagon screw
- ❑ 70 Nm + 90°
- ❑ Replace after each removal

If the soldered nut thread is damaged, it can be repaired with a Heli-Coil thread insert

Servicing thread in longitudinal member ⇒ page 9

12 - Rubber support bearing for the console
- ❑ Remove and install ⇒ page 19

13 - ?Support arm
- ❑ Remove and install ⇒ page 14

14 - Plate with nuts

15 - Self-locking nut
- ❑ 20 Nm + 90°
- ❑ Replace after each removal

16 - Swivel tip
- ❑ Check ⇒ page 10
- ❑ Remove and install ⇒ page 11
- ❑ Installation position ⇒ page 14

17 - Hexagon screw
- ❑ 20 Nm + 90°
- ❑ Replace after each removal

18 - Air deflector plate
- ❑ Only on vehicles with 13" running gear

19 - Spreader rivet
- ❑ Only on vehicles with 13" running gear

20 - Hexagon screw
- ❑ 20 Nm + 90°
- ❑ Replace after each removal

21 - Hexagon screw
- ❑ ⇒ Item 16 (page 154)

- ❑ Replace after each removal
- ❑ follow the sequence for installing and tightening the screws:
- ❑ First, screw the hex head screw ⇒ Item 23 (page 9) -, but do not tighten it definitively. Then, also screw the hex head screw ⇒ Item 21 (page 8) -, but do not tighten it definitively
- ❑ Then, tighten the hex head screws alternately

22 - Hexagon screw

- ❑ 30 Nm + 90°
- ❑ Replace after each removal

23 - Hexagon screw

- ❑ 70 Nm + 90°
- ❑ Replace after each removal
- ❑ follow the sequence for installing and tightening the screws:
- ❑ First, screw the hex head screw ⇒ Item 23 (page 9) -, but do not tighten it definitively. Then, also screw the hex head screw ⇒ Item 21 (page 8) -, but do not tighten it definitively
- ❑ Then, tighten the hex head screws alternately

24 - Hexagon screw

- ❑ 40 Nm + 90°
- ❑ Replace after each removal

25 - Pendulum support

2.1 Threads in longitudinal member - repair

It is possible to repair the welded nut threads in the longitudinal member depending on certain conditions:

- ♦ The repair must only be performed once in each thread
- ♦ If a second repair is necessary, the soldered nut must be replaced
- ♦ Follow the work instructions in the VAS repair set

> ⚠ Caution
>
> *When drilling, it is mandatory to wear safety goggles.*

- ♦ Make your supervisor or immediate superior check the thread repair
- ♦ Rectify any damage to the underbody sealant layer ⇒ Body - Repairs; General notes; Anti-corrosion protection measures
- ♦ Use only the repair sets listed on the table for the repair works

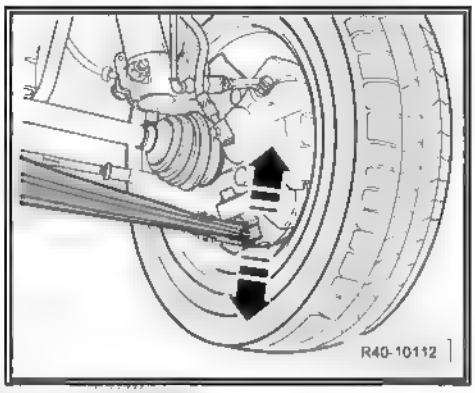
2.1.1 VAS thread repair set

Thread	VAS number
M8	6022
M10	6024
M12×1.5	6026

2.2 Swivel tip - check

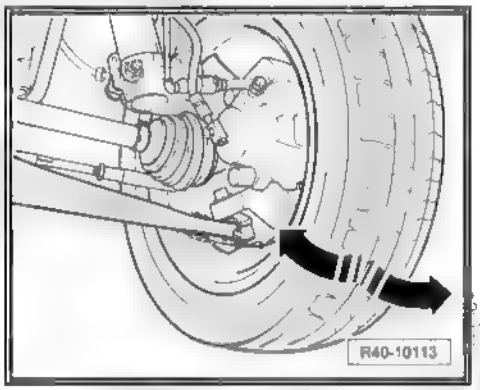
Check axial clearance:

– Pull the wishbone -towards the arrow- vigorously down and press it up again



Check radial clearance:

– Press lower part of wheel forcefully outwards and inwards.



Note

- *No visible or noticeable clearance, when performing both tests*
- *Observe the swivel tip during the check*
- *Consider an eventual "play" in the wheel roller bearing or in the upper support of the suspension column*
- *Check the rubber bellows for damages, replace the swivel tip, if necessary*

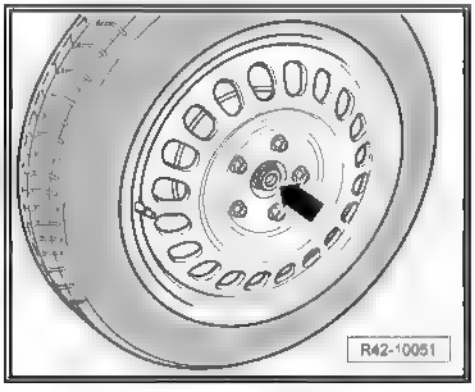
2.3 Swivel tip - remove and install

Special tools and workshop equipment required

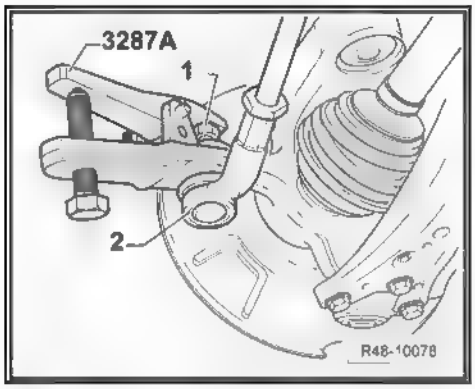
- Extractor -3287A-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-
- Torque wrench 20 - 100 Nm -VAG 1756-
- ?Star socket 36mm or Gedore Ref. D32-36 -T 10125-
- Extractor -3283-

2.3.1 Removal

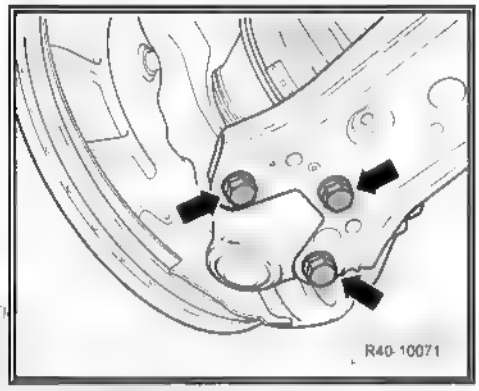
- Lift the vehicle until the front axle is without any load.
- Loosen the grooved nut -arrow- with the ?Star socket 36mm or Gedore Ref. D32-36 -T 10125- or the 30-mm star socket.
- Remove the wheel.



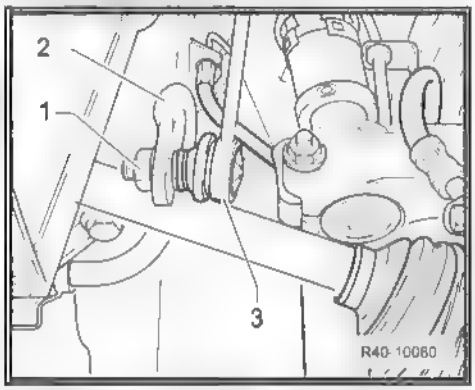
– Loosen the fastening nut -1- from the yoke.
– Separate the steering yoke tip -2- from the wheel roller bearing case, by using the Extractor -3287 A- .
– Mark the position for the swivel tip screws on the wishbone



– Remove the attaching screws -arrows-.
– Move the suspension column together with the swivel joint on the wishbone.



– Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
– Remove the coupling rod -3- from the anti-roll bar -2-.

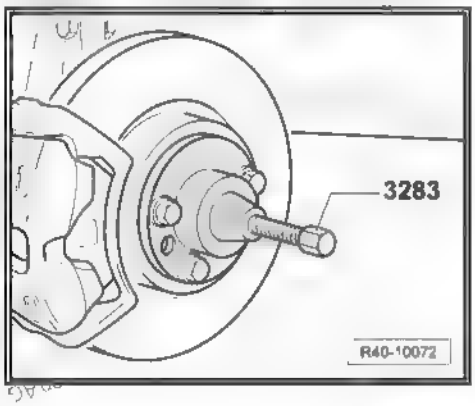


– Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.

Note

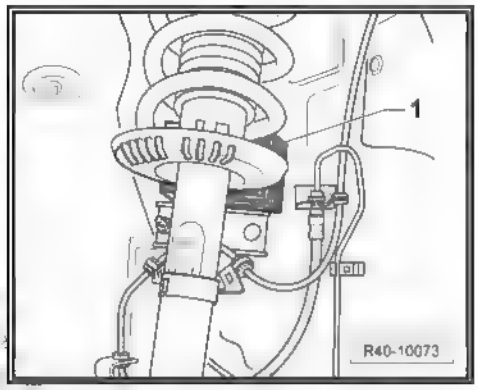
While pressing the drive axle shaft outwards, make sure you have enough free space.

– Remove the wheel roller bearing case with the shaft articulation out of the transverse arm.



– Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing.

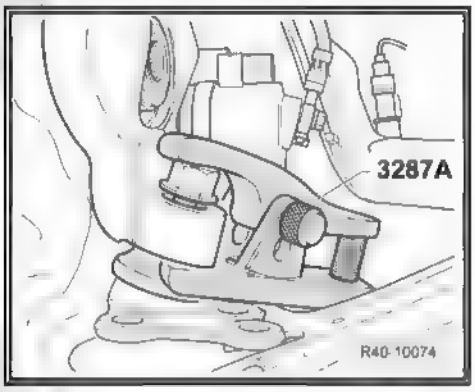
– Fasten the drive axle shaft to the body with a wire.



Note

The drive axle shaft must not be pressed downwards. Otherwise the internal articulation will be damaged due to excessive tilting.

– Position the Extractor -3287A- as indicated in illustration and press the swivel joint.



Note

In order to protect the swivel joint, leave the nut threaded a few turns.

2.3.2 Installation

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

Install by inverting the removal sequence, paying attention to the following:

– Screw on self-locking nuts, counter-holding with T40 Torx key. Tightening torque ⇒ Item 15 (page 8) .

– Install the drive shaft in the wheel roller bearing.

Note

Check if the gaiters are not damaged or twisted.

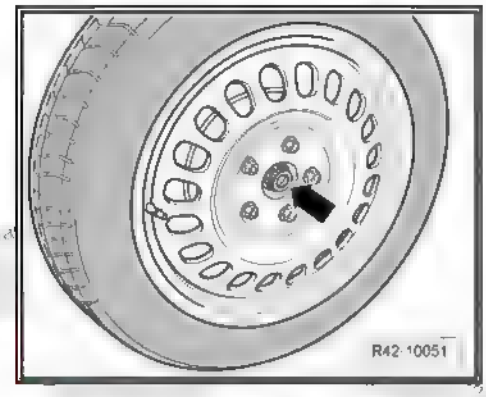
– Fasten the swivel tip to the wishbone (screws on old marks). Tightening torque ⇒ Item 17 (page 8) .

– Install the wheels and tighten the screws ⇒ page 88 .

– Tighten the splined nut -arrow -.

- Vehicles with ABS brakes → Item 14 (page 28) .

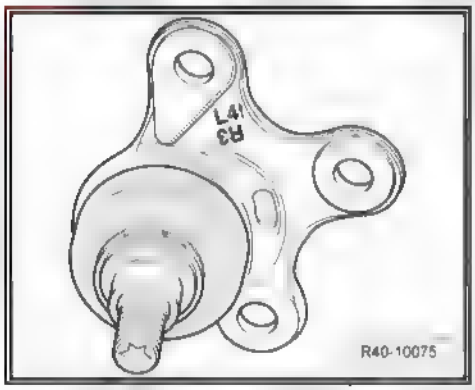
- Vehicles without ABS brakes → Item 13 (page 28) .



2.4 Swivel joint - installation position

Left swivel tip

The arrow marked with "L4" points to the vehicle traveling direction for the 14" running gear

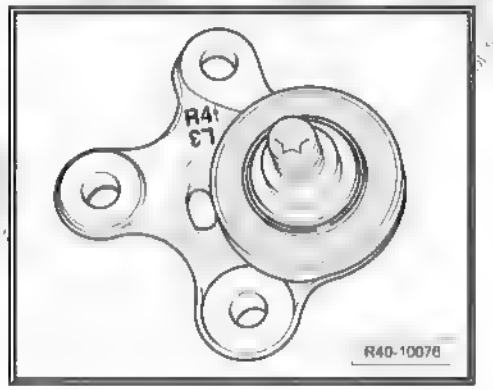


Right swivel tip

The arrow marked with "R4" points to the vehicle traveling direction for the 14" running gear

Note

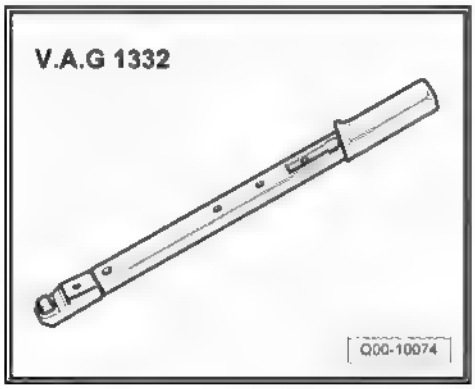
If the installation position is incorrect, the caster will be wrong.



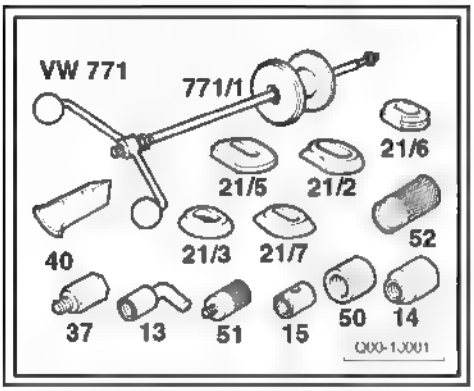
2.5 Support arm - remove and install

Special tools and workshop equipment required

♦ "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-



- Bushing and bearing extractor -VW 771-

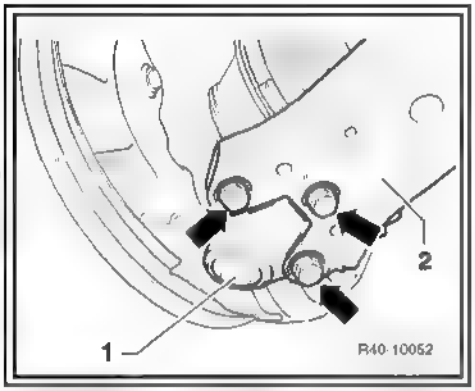


2.5.1 Removal

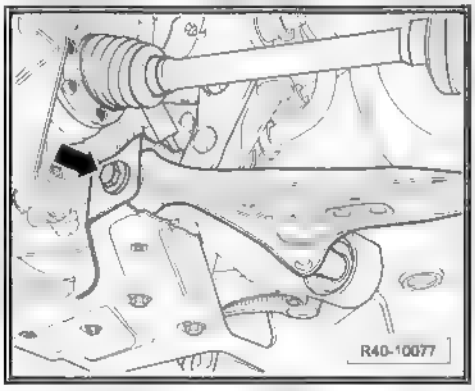
- Lift the vehicle until the front axle is without any load.
- Remove the wheel.

If it is not necessary to replace the wishbone:

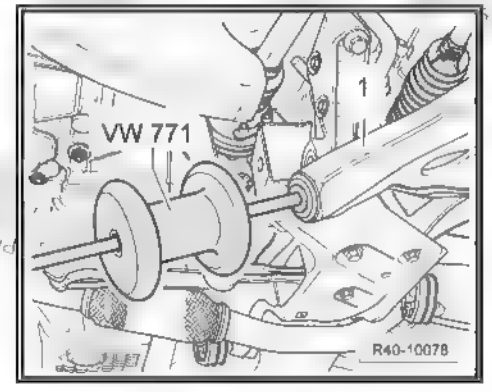
- Mark the installation position of the screws -arrows- from the the swivel tip -1- to supporting arm -2-.
- Remove screws -arrows-.
- Remove the wheel roller bearing case and the axle articulation from the wishbone.



- Mark the assembly position of screw -arrow-, loosen and pull the console articulated arm.



- Remove supporting arm -1- with Bushing and bearing extractor -VW 771- from the console.



2.5.2 Installation

Caution

- *While installing, watch the installation position of the support arm in relation to the console. The wishbone hexagonal end must match the one from the metal-rubber support in the console.*
- *The wishbone must be at the same level as the subframe.*
- *If the assembly position is not followed, the console metal-rubber bearing may be damaged, consequently reducing its durability.*

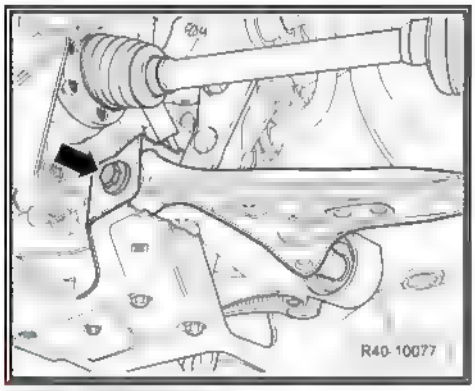
– Install the wishbone to the console with the help of a rubber hammer if necessary.

– Install screw -arrow- and tighten it. Tightening torque ⇒ Item 23 (page 9) .

– Insert the swivel tip in the wishbone.

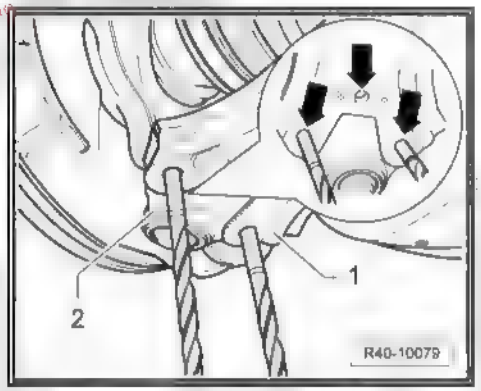
– If the wishbone is not replaced, tighten the swivel tip screws firmly on the previous marking ⇒ Item 17 (page 8) .

If the wishbone is replaced:



– Position supporting arm -1- and the swivel joint -2- so that the corresponding holes -arrows- are lined-up among them.

For improved fastening, use two drifts with 8.3 mm ∅ or, as represented in the figure, two drills with 8.3 mm ∅.



– The remaining installation steps are carried out in reverse order of removal.

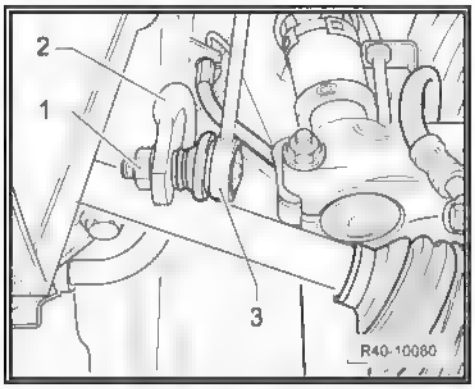
– Fit wheel and tighten screws ⇒ page 88 .

2.6 Console - remove and install

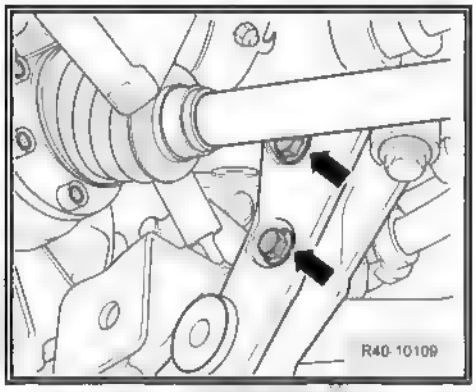
2.6.1 Removal

– Remove supporting arm ⇒ page 14 .

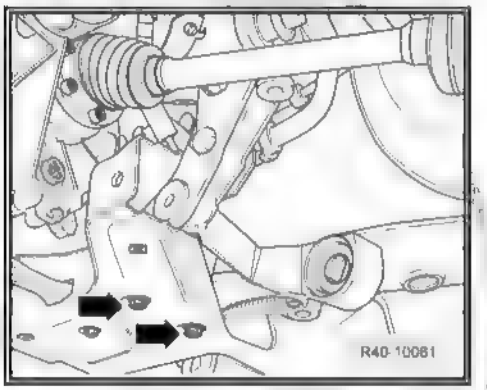
– Remove the hexagon nuts -1- from the connecting rod.
– Remove the coupling rod -3- of stabilizer -2- to both sides.



– Remove screws -arrows-.

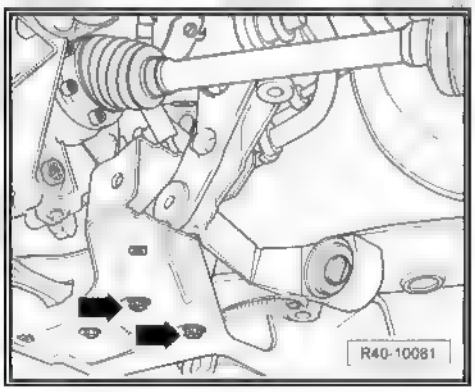


– Remove screws -arrows-.
– Position the subframe ⇒ page 20 .
– Remove the console from the subframe.

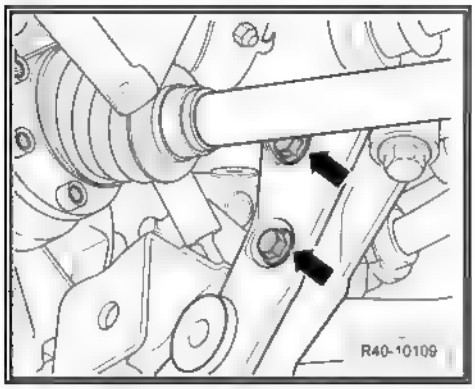


2.6.2 Installation

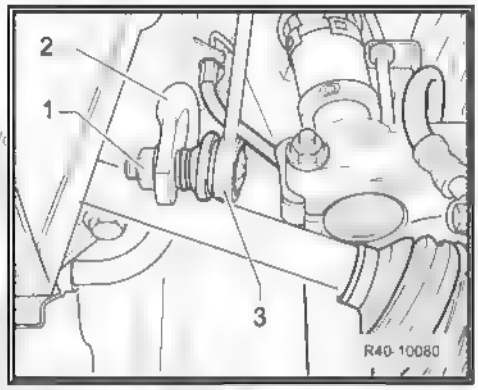
– Install the console on the subframe.
– Install the screws -arrows-.
– Position the subframe ⇒ page 20 .



– Install the anti-roll bar on the console -arrows-.



– Install the coupling rod -3- to stabilizer -2- to both sides.
– Install supporting arm ⇒ page 14 .



Tightening torque	Nm
Subframe console [2] ♦ Follow the tightening sequence ⇒ Item 23 (page 9)	70 Nm + 90°
Console to body ⇒ Item 11 (page 8) [1]	70 Nm + 90°
Subframe console [1] ♦ Follow the tightening sequence ⇒ Item 21 (page 8)	50 Nm + 90°
Anti-roll bar to console ⇒ Item 20 (page 8) [1]	20 Nm + 90°
Coupling rod to anti-roll bar ⇒ Item 2 (page 7) [1]	40 Nm

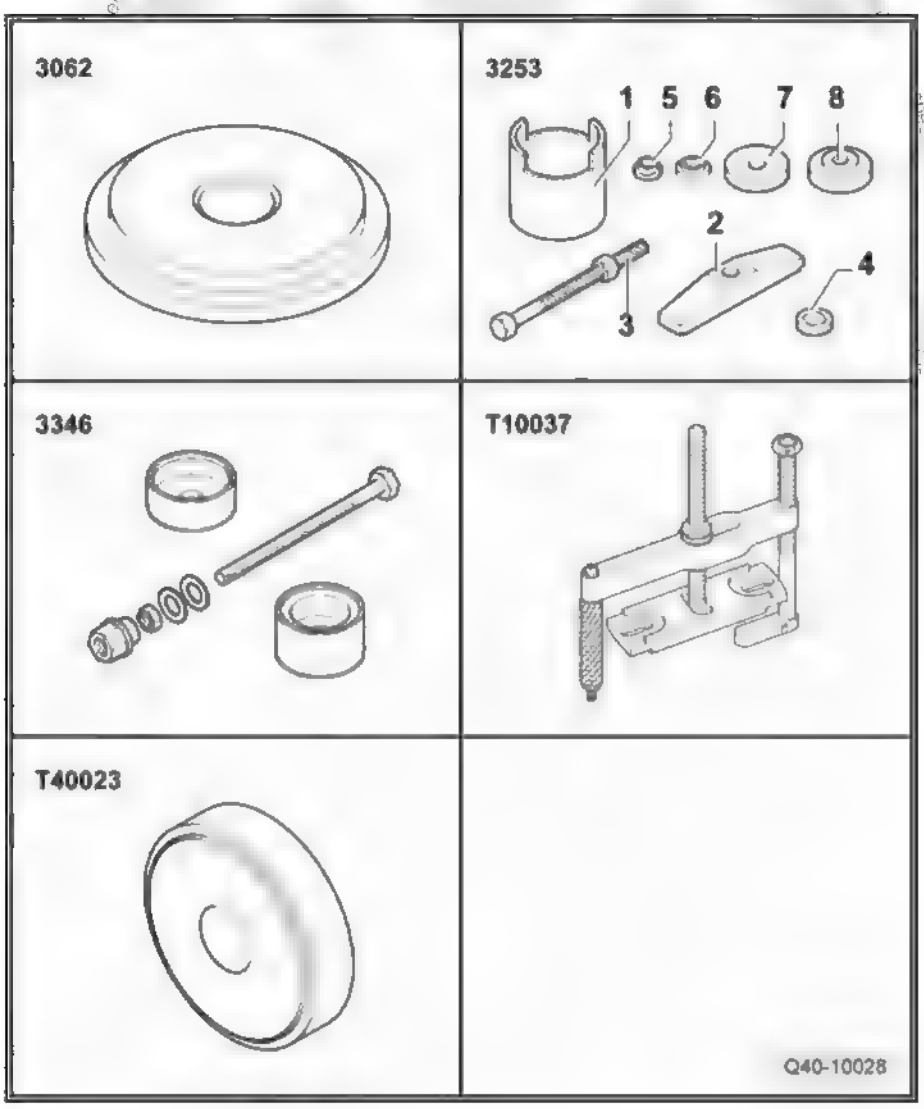
1) Use new screws/nuts

2) Tighten the screws/nuts with the vehicle unladen

2.7 Rubber support bearing for the console - replace

Special tools and workshop equipment required

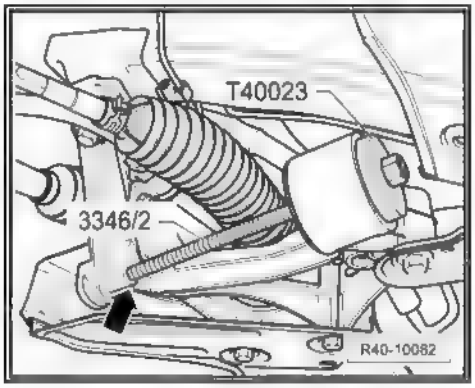
- Pressure Disc -3062-
- Mounting device -3253-
- Fitting tool -3346-
- Extractor -T10037-
- Extractor / Fitting tool -T 40023-



- Remove supporting arm ⇒ page 14 .
- Partially remove the noise insulation. ⇒ General body repairs, external; Rep. Gr. 50 ; Body - front section .

2.7.1 Remove bonded rubber bush

- Press the noise insulation down and position the Fitting tool -3346/2- and Extractor / Fitting tool -T 40023- behind the support.
- Using the Fitting tool -3346/2- , screw the thread on the console -arrow- until the tool Extractor / Fitting tool -T 40023- seat on support.
- Remove the metal and rubber bearing

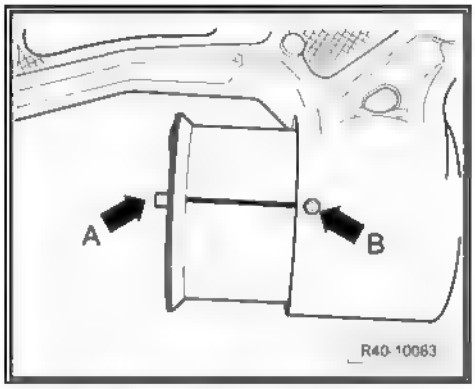


2.7.2 Install the metal-rubber bearing on the console

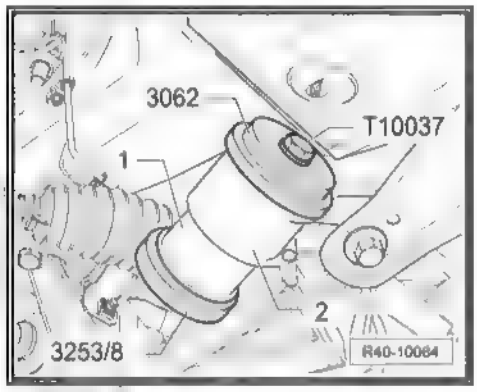
Installation position of the metal and rubber bearing on the console:

The pin on the metal-rubber bearing -arrow A- must be aligned with the console marking -arrow B-.

- Draw a perpendicular line to the bearing with a pen, for example, to easy the installation.
- Apply a thin coat of tire mounting paste onto the metal-rubber bearing.



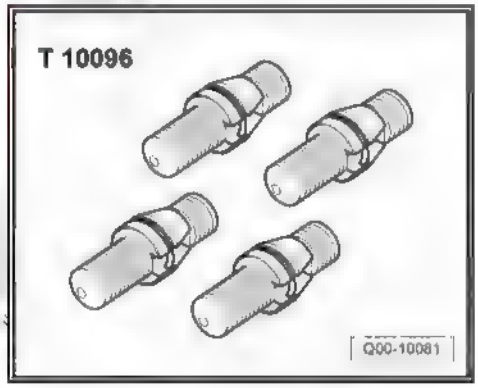
- Install bonded rubber mounting -1- to the console -2-.
- Fasten the noise insulation.⇒ General body repairs, external; Rep. Gr. 50 ; Body - front section .
- Install supporting arm ⇒ page 14 .



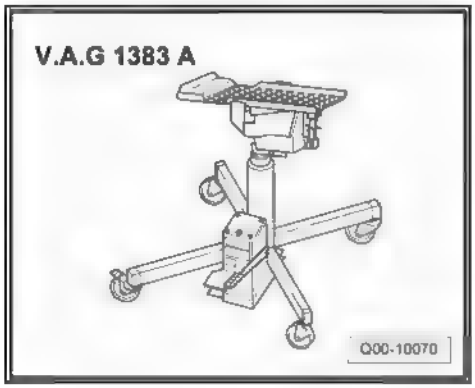
2.8 Subframe - position

Special tools and workshop equipment required

- Location pins -T 10096-

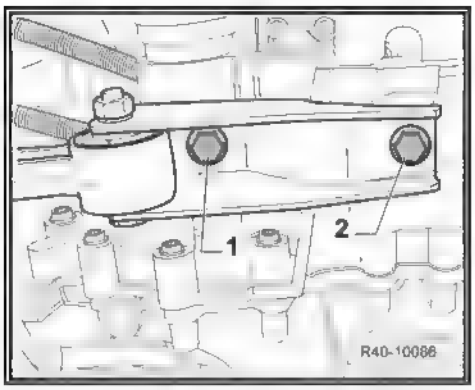


- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-



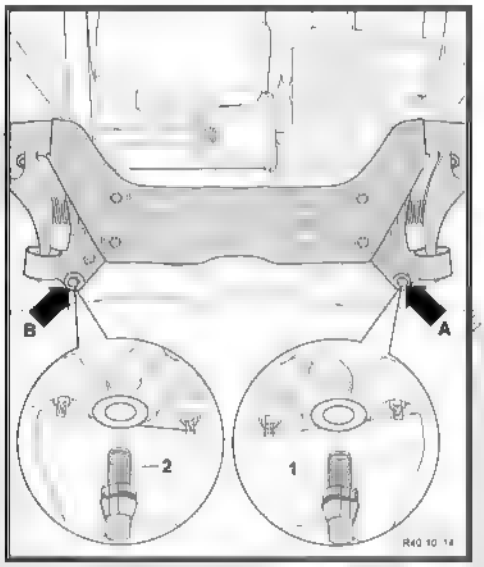
2.8.1 Removal

- Loosen and remove screws -1- and -2- from gearbox pendulum support
- Remove the front exhaust tube ⇒ Engine, Rep Gr. 26 , Exhaust system .
- Install the Engine and gearbox jack + gearbox or EQ 7081 - VAG 1383A- under the subframe.
- Clean the fastening device threads with the Location pins -T 10096- .



In the following work phases, it is mandatory to follow the sequence:

- Remove the screws of the rear support.
- Remove fixing screws -arrow A- from the subframe and screw the Location pins -T 10096- -1- with 20 Nm.
- Remove fixing screws -arrow B- from the subframe and screw the Location pins -T 10096- -2- with 20 Nm.



Note

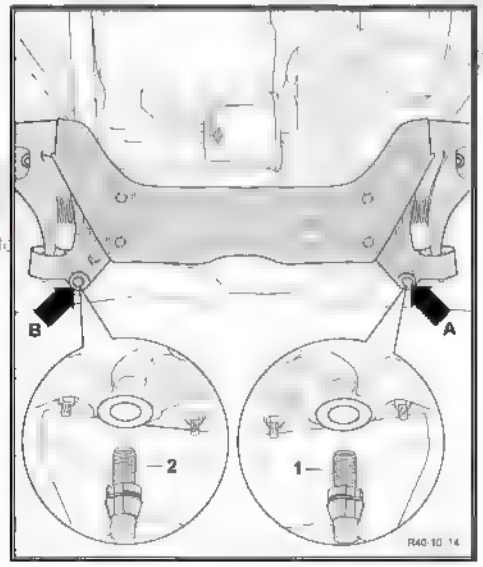
The Location pins -T 10096- must only be tightened up to 20 Nm. Otherwise, the device thread will be damaged.

- Remove the next screw and tighten again the Location pins -T 10096- with 20 Nm.
- The subframe fastening will be concluded when all 4 screws have been replaced by the Location pins -T 10096- .
- Lower the subframe about 4 cm.

2.8.2 Installation

Install by inverting the removal sequence, paying attention to the following:

- Position the subframe.
- Always remove one fastening device at a time and replace it with a new screw -arrow-.
- Tighten this screw to the specified torque ⇒ page 22 .



Note

After installing, check the position of the steering wheel during a test drive. If the steering wheel is not in the straight forward position, the axle geometry must be checked.

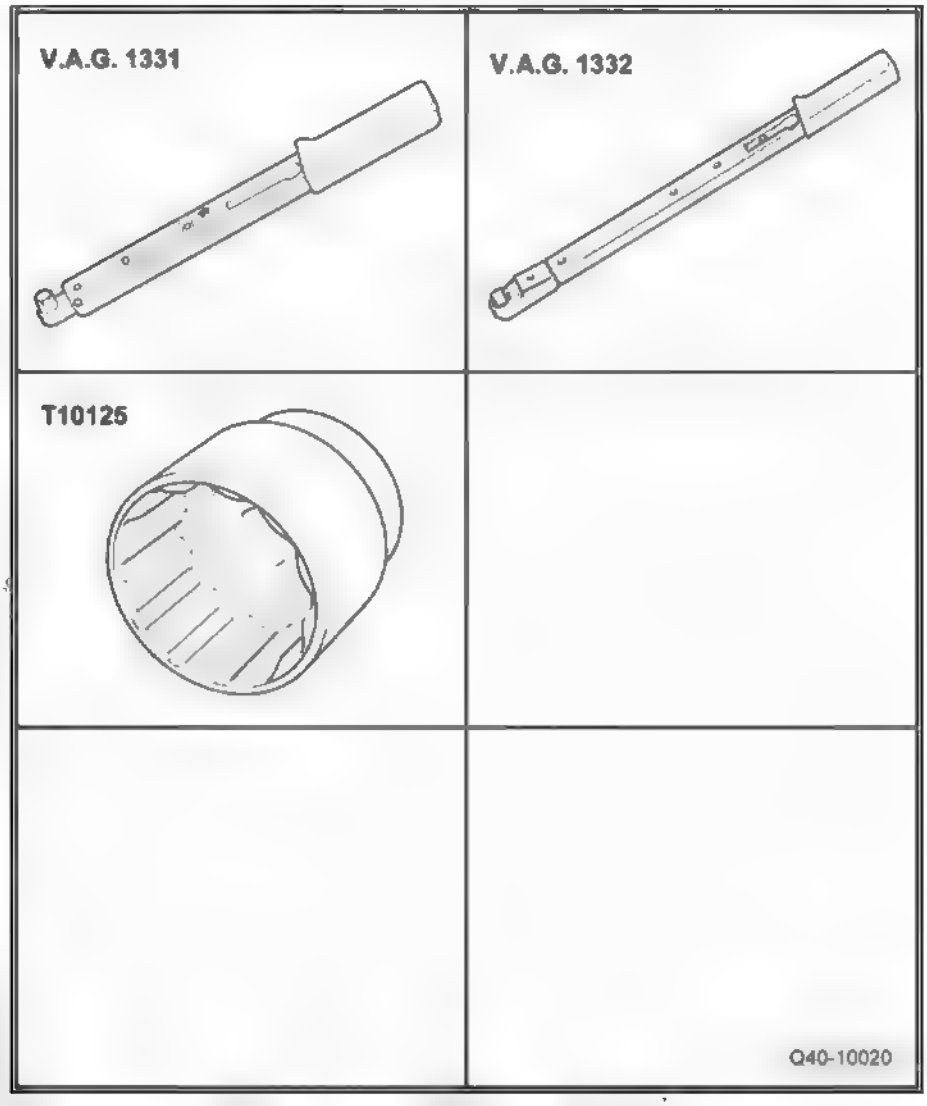
2.8.3 Tightening torque

Tightening torque	Nm
Subframe to body	70 Nm + 90°
Support to body	20 Nm + 90°
Pendulum support to gearbox	30 Nm + 90°

2.9 Subframe - remove and install

Special tools and workshop equipment required

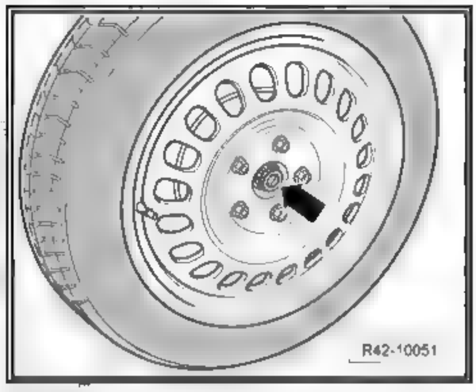
- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- ?Star socket 36mm or Gedore Ref. D32-36 -T 10125-



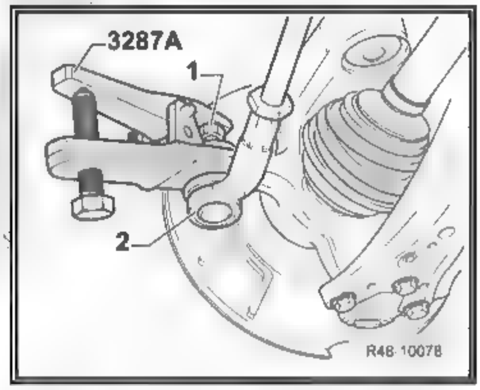
2.9.1 Removal

– Lift the vehicle until the front axle is without any load.

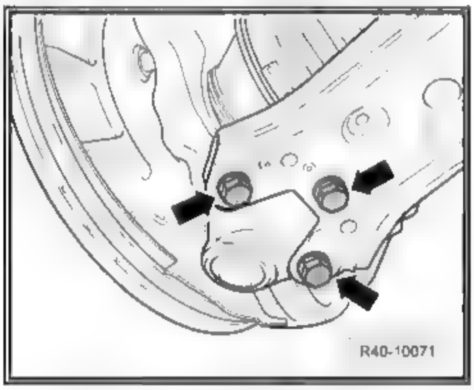
- Loosen the grooved nut -arrow- with the ?Star socket 36mm or Gedore Ref. D32-36 -T 10125- or the 30-mm star socket.
- Remove the wheel.



- Loosen the fastening nut -1- from the yoke.
- Separate the steering yoke tip -2- from the wheel roller bearing case, by using the Extractor -3287 A- .
- Mark the position for the swivel tip screws on the wishbone.

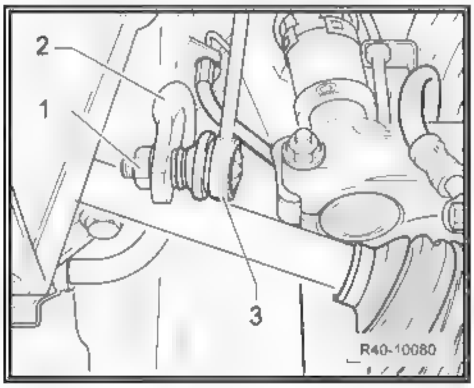


- Remove the attaching screws -arrows-.
- Move the suspension column together with the swivel joint on the wishbone.

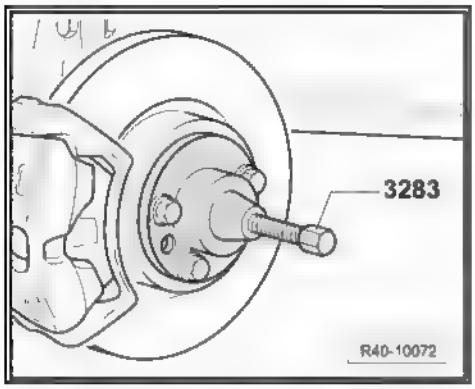


- Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
- Remove the coupling rod -3- from the anti-roll bar -2-.

Continuation for all vehicles:



– Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.

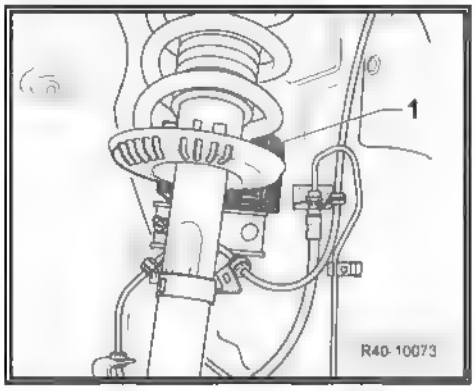


Note

While pressing the drive axle shaft outwards, make sure you have enough free space.

– Remove the wheel roller bearing case with the shaft articulation out of the transverse arm.

– Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing.

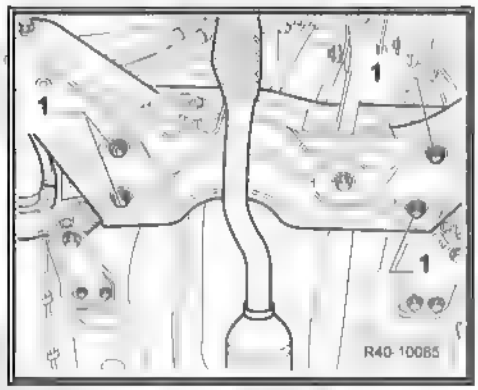


– Fasten the drive axle shaft to the body with a wire.

Note

The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.

– Loosen the fastening screws -1- from the steering box to subframe and fasten it to the body (for example, with a wire).



– Position the subframe ⇒ page 20 .

– Lower the subframe using the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- .

2.9.2 Installation

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

Install by inverting the removal sequence, paying attention to the following:

– Position the subframe ⇒ page 20 .

– Fasten the steering box to the subframe. Tightening torque ⇒ Item 16 (page 154) .

– Install the drive shaft in the wheel roller bearing.

Note

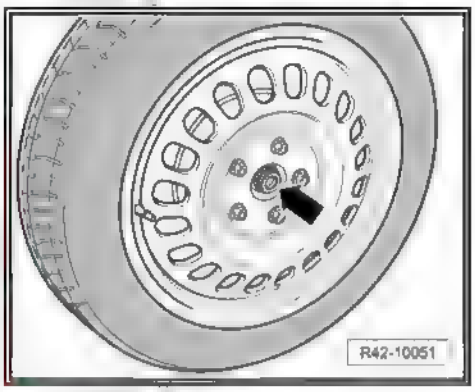
Check if the bellows are not damaged or twisted

– Fasten the swivel tip to the wishbone (screws on old marks). Tightening torque ⇾ Item 17 (page 8) .

– Install the wheels and tighten the screws ⇾ page 88 .

– Tighten the splined nut -arrow-.

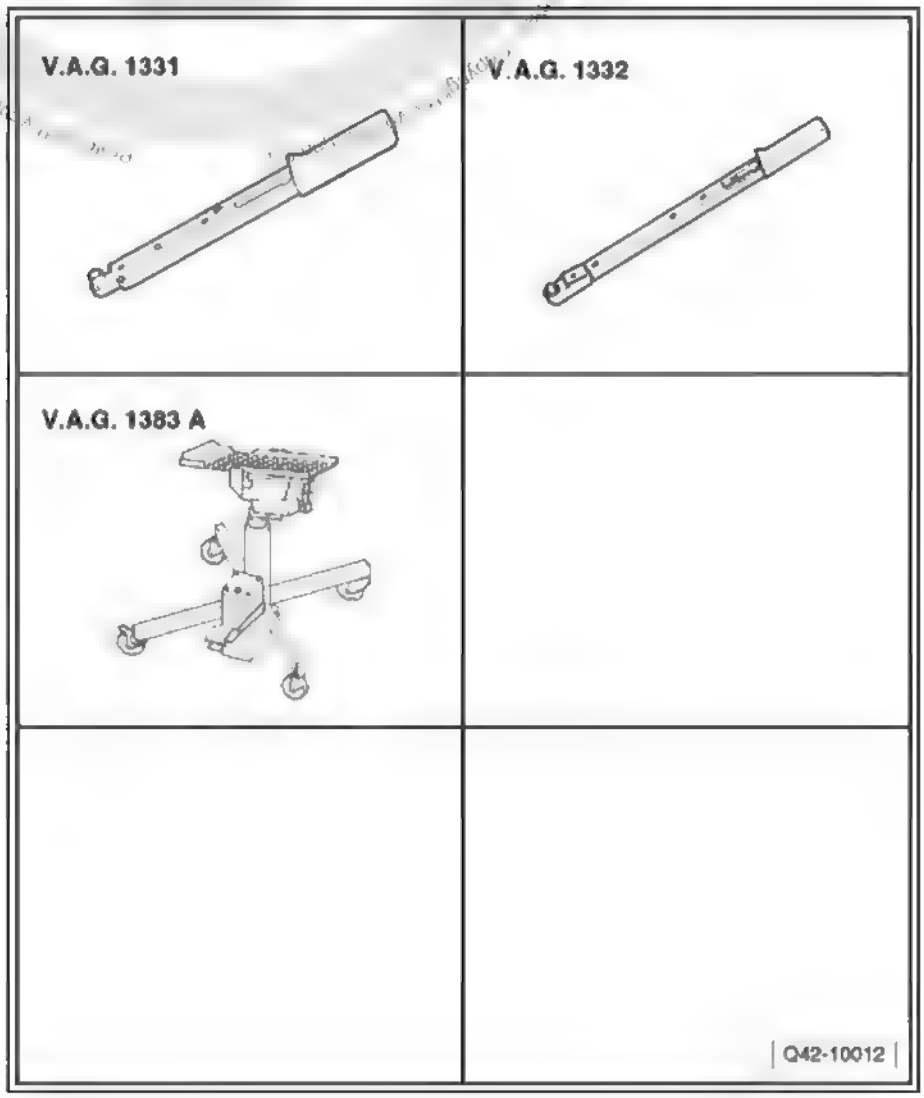
- Vehicles with ABS brakes ⇾ Item 14 (page 28) .
- Vehicles without ABS brakes ⇾ Item 13 (page 28) .



2.10 Anti-roll bar for vehicles with power steering - remove and install

Special tools and workshop equipment required

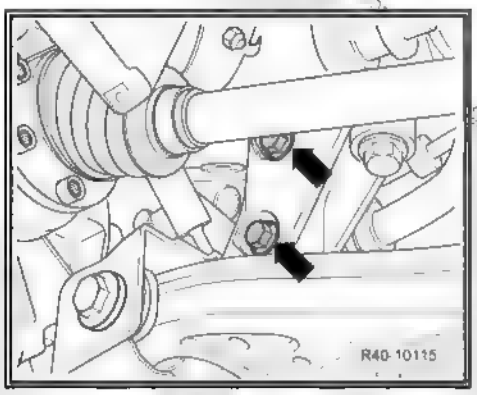
- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-



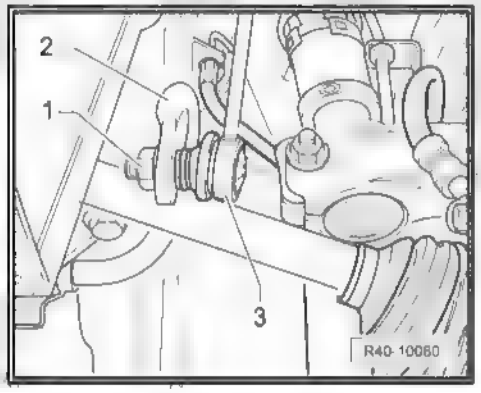
2.10.1 Removal

– Remove the wheel.

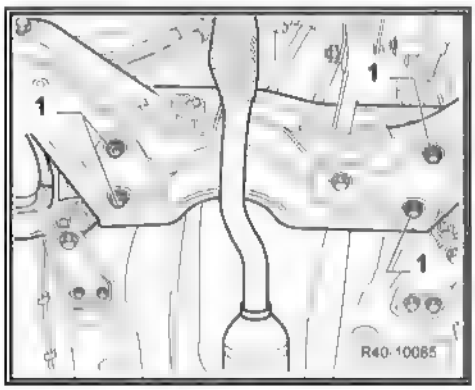
- Remove the noise insulation. ⇒ General body repairs, external; Rep. Gr. 50 ; Body - front section .
- Remove screws -arrows-.



- Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
- Remove the coupling rod -3- from the anti-roll bar -2-.



- Loosen the fastening screws -1- from the steering box to subframe and fasten it to the body (for example, with a wire).
- Position the subframe ⇒ page 20 .
- Lower the subframe with the help of the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- .
- Remove the anti-roll bar laterally.



2.10.2 Installation

Install by inverting the removal sequence, paying attention to the following:

- Install the anti-roll bar and fasten it to the console with the clamps ⇒ Item 20 (page 8) .
- Position the subframe ⇒ page 20 .
- Fasten the steering box to the subframe. Tightening torque ⇒ Item 16 (page 154) .
- Install the wheels and tighten the screws ⇒ page 88 .

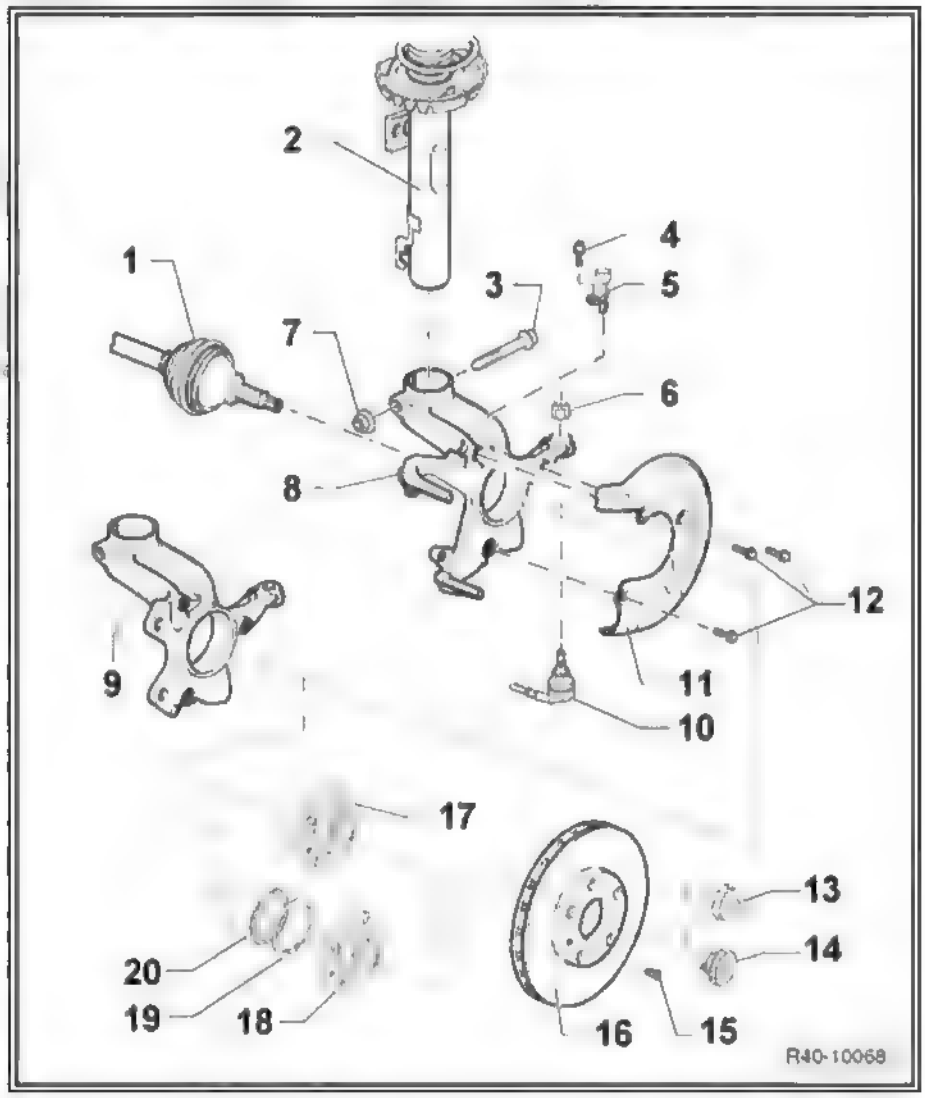
3 II - Wheel roller bearings - repair

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

Note

- *Soldering and straightening works are not permitted in supporting components from the suspension or in components located on the wheels*
- *Always replace corroded screws/nuts*



1 - Drive shaft

2 - Suspension pillar
- ❑ remove and install ⇒ page 47

3 - Internally ??splined bolt
- ❑ the tip on the hex head screw must point in direction of travel

4 - Hexagon socket head screw
- ❑ 8 Nm

5 - Speed sensor
- ❑ before installing the sensor, you must clean the internal surface of the hole and apply Temperature-resistant grease -G 000 650- . Refer to the ⇒ Chemical material manual

6 - Self-locking nut
- ❑ 20 Nm + 90°
- ❑ replace after each removal

7 - Self-locking nut
- ❑ 60 Nm + 90°
- ❑ replace after each removal

8 - Wheel roller bearing case
- ❑ for FS II and FS III brake calipers
- ❑ different versions for 13" and 14" running gears
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

9 - Wheel roller bearing case
- ❑ for C54 brake calipers
- ❑ different versions for 15" running gear.

- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

10 - Track rod ball joint

11 - Splash plate

12 - Hexagon screw

- ❑ 10 Nm

13 - Self-locking nut

for vehicles without ABS

- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)
- ❑ first tighten to 200 + 50Nm and loosen (going back) 180°, then tighten further to 50 Nm + 50°
- ❑ apply first White lubricating grease -G 052 751 A1- on the grooves and outer thread of the drive semi-shaft, which must be previously cleaned. Refer to the ⇒ Chemical material manual
- ❑ replace after each removal

14 - Self-locking nut

for vehicles with ABS

- ❑ tightening torque for 13" running gear (black nut) = 50 Nm
- ❑ tightening torque for 14" and 15" running gear (silver nut) = 50 Nm + 45°
- ❑ replace after each removal

– Apply first Adhesive -D 185 400 A2- on the grooves and outer thread of the drive semi-shaft, which must be previously cleaned. Refer to the ⇒ Chemical material manual .

WARNING

The torque must be applied within 2 minutes after inserting the shaft tip into the wheel hub. After the torque, the vehicle must remain at least 1.5 hours with no strain on the semi-shaft.

15 - Screw

- ❑ 4 Nm

16 - Ventilated brake disc

17 - Wheel hub with wheel bearings

for vehicles with ABS

- ❑ the ABS sensor ring is installed in the wheel hub
- ❑ different versions for 13", 14" and 15" running gears
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)
- ❑ remove (vehicles with 13" running gear) ⇒ page 35
- ❑ remove (vehicles with 14" and 15" running gears) ⇒ page 41
- ❑ replace, because it is destroyed when removed
- ❑ install (vehicles with 13" running gear) ⇒ page 35
- ❑ install (vehicles with 14" and 15" running gears) ⇒ page 41

18 - Wheel hub without roller bearing

for vehicles without ABS

- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)
- ❑ remove and install ⇒ page 29

19 - Safety ring

for vehicles without ABS

- ❑ 72 X 2 5
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)
- ❑ remove and install ⇒ page 29

20 - Double ball bearing

for vehicles without ABS

- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)
- ❑ remove and install ⇒ page 29

3.1 Wheel roller bearing for vehicles without ABS - remove and install

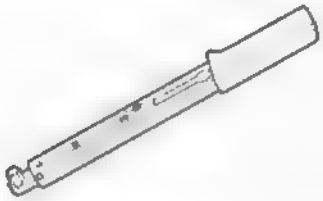
Special tools and workshop equipment required

- Mounting device -3253-
- Fixed wrench 50mm -3254-
- ?Star socket 36mm or Gedore Ref. D32-36 -T 10125-
- Device -T10030-
- Extractor and Fitting tool KUKKO 20/10 -VW 045Z- and Grip -VW 045Z/1-
- Basis -VW 295A-

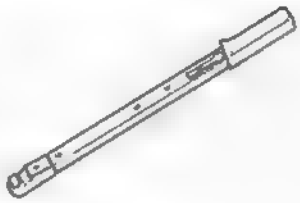
Special tools and workshop equipment required

- Torque wrench - 5 to 50 Nm (socket 1/2") -VAG 1331-
- Torquemeter - 40 to 200 Nm (socket 1/2") -VAG 1332-
- Similar - EQ 7081 - Engine and gearbox jack + gearbox -VAG 1383A-
- Thrust pad -VW 472/1-
- Pressure tube -VW 418A-
- Thrust pad -VW 442-
- Pulling device -VW 202K-
- Torque wrench - 4 to 20 Nm (socket 3/8") -VAG 1410-

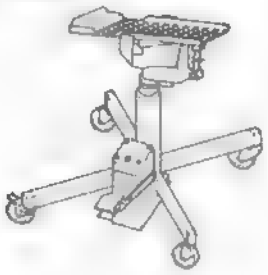
V.A.G. 1331



V.A.G. 1332

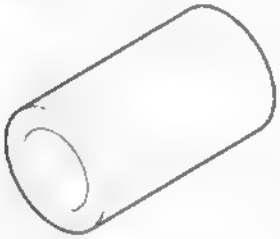


V.A.G. 1383A

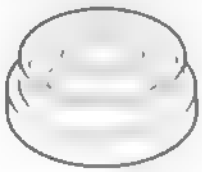


VW 472/1

VW 418A



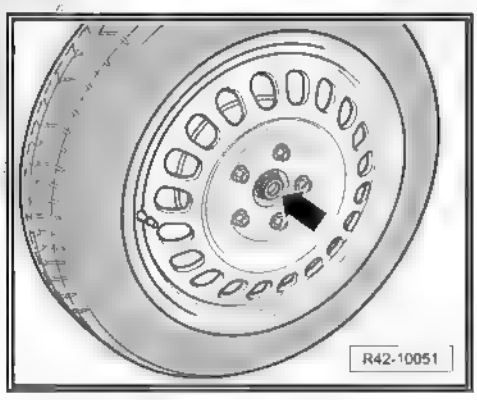
VW 442



Q40-10023

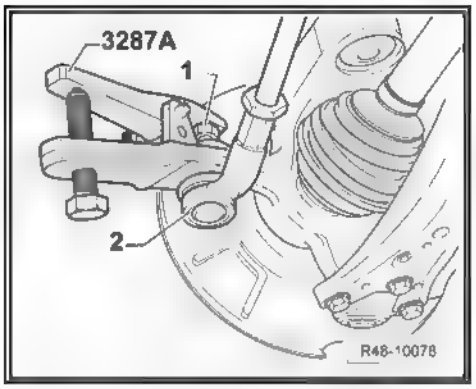
3.1.1 Removal

- Lift the vehicle until the front axle is without any load.
- Loosen the grooved nut -arrow- with the ?Star socket 36mm or Gedore Ref. D32-36 -T 10125- or the 30-mm star socket.
- Remove the wheel.

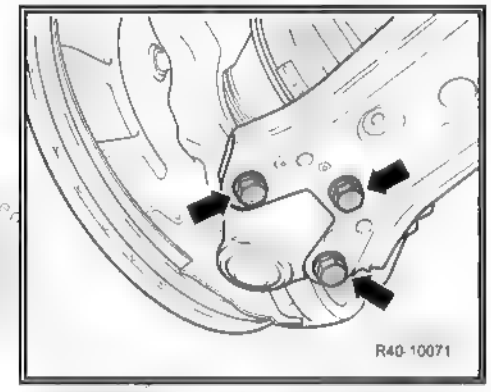


R42-10051

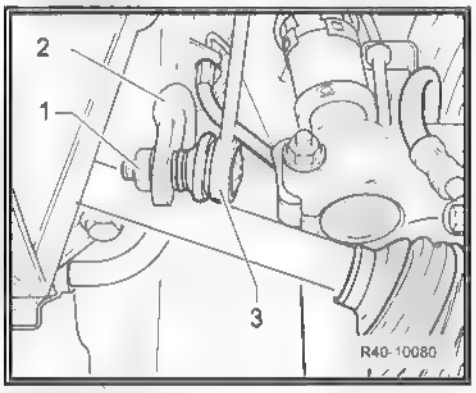
- Loosen the fastening nut -1- from the yoke.
- Separate the steering yoke tip -2- from the wheel roller bearing case, by using the Extractor -3287 A- .
- Mark the position for the swivel tip screws on the wishbone



- Remove the attaching screws -arrows-.
- Move the suspension column together with the swivel joint on the wishbone.



- Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
- Remove the coupling rod -3- from the anti-roll bar -2-.

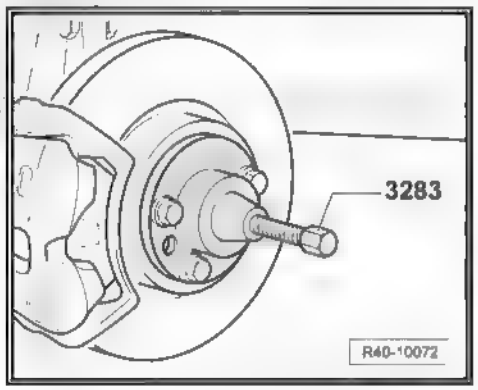


- Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.

Note

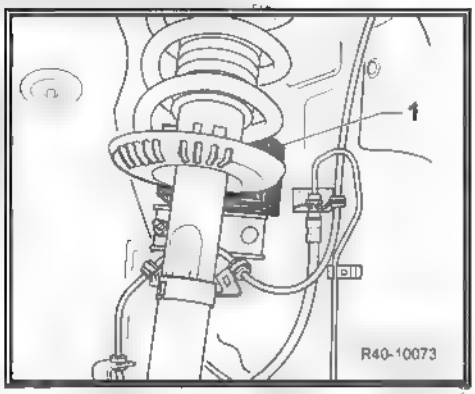
While pressing the drive axle shaft outwards, make sure you have enough free space.

- Remove the wheel roller bearing case with the shaft articulation out of the transverse arm



– Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing.

– Fasten the drive axle shaft to the body with a wire.



Note

The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting

– Remove disc brake caliper and tie it to body with wire ⇒ Brake system, Rep. Gr. 46 , Brakes - Mechanical systems .

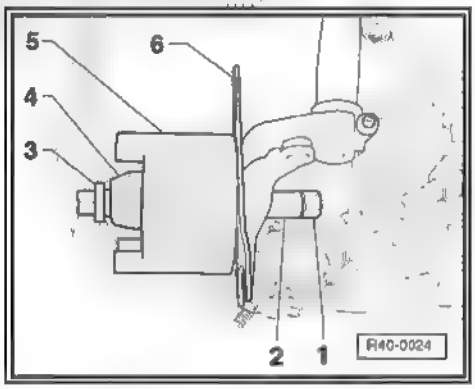
– Remove the Phillips screw from the brake disc and remove the brake disc

– Remove the cover plate

Note

Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- underneath (danger of accident from falling parts when extracting the wheel hub and the wheel roller bearing)

3.1.2 Remove the wheel roller bearing hub



Install the removal device

1 - Mounting device -3253/3-

2 - Pressure tube -VW 418A-

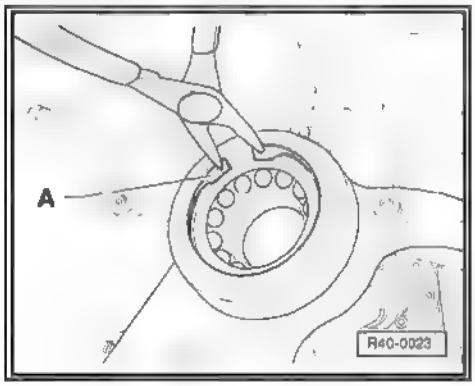
3 - Mounting device -3253/6-

4 - Mounting device -3253/2-

5 - Mounting device -3253/1-

6 - Open-end spanner, 50 mm -3254-

Remove the circlip -A- with pliers



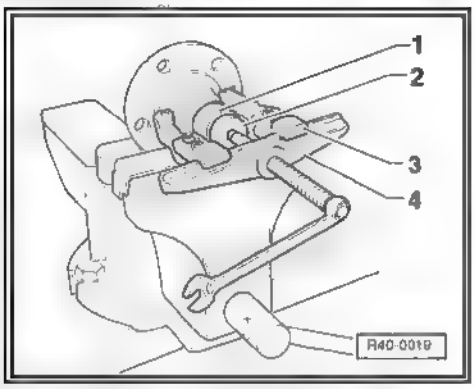
Remove the wheel bearing inner track

1 - Basis -VW 295A-

2 - Pulling device -VW 202K-

3 - Extractor and Fitting tool KUKKO 20/10 -VW 045Z/1-

4 - Extractor and Fitting tool KUKKO 20/10 -VW 045Z-



Remove the wheel roller bearing by removing it from the wheel roller bearing case

1 - Mounting device -3253/5-

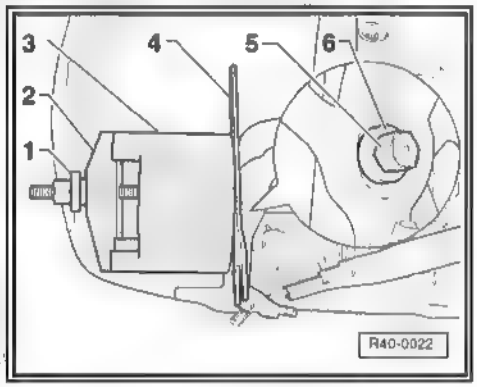
2 - Mounting device -3253/2-

3 - Mounting device -3253/1-

4 - Open-end spanner, 50 mm -3254-

5 - Mounting device -3253/6-

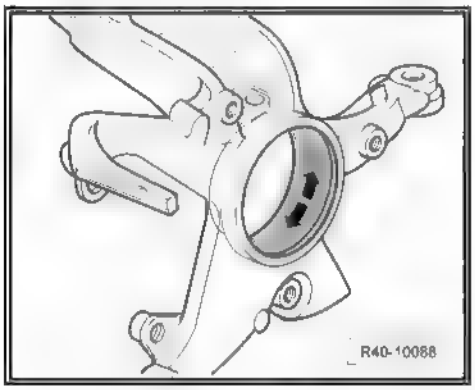
6 - Mounting device -3253/3-



3.1.3 Installation

– Clean the residues from the wheel roller bearing housing in the wheel roller bearing case.

– Lubricate the surface of wheel bearing case with Molybdenum grease -G 052 723 A2- . Refer to the ⇒ Chemical material manual .



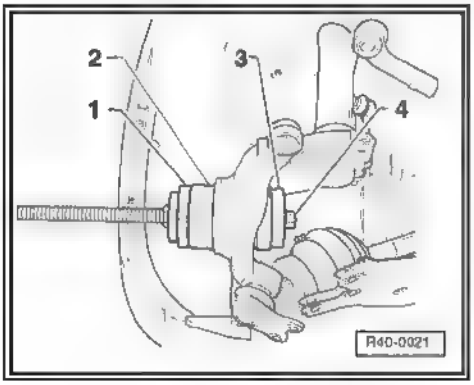
Install the wheel roller bearing in the wheel roller bearing case

1 - Thrust pad -VW 442-

2 - Wheel bearing

3 - Assembly device -T 10064/4-

4 - Device -T 10030/3-



Note

Pay attention to the correct alignment of the roller bearing in relation to the roller bearing case

– Install the lock ring on the wheel bearing case

Install the wheel hub in the wheel roller bearing

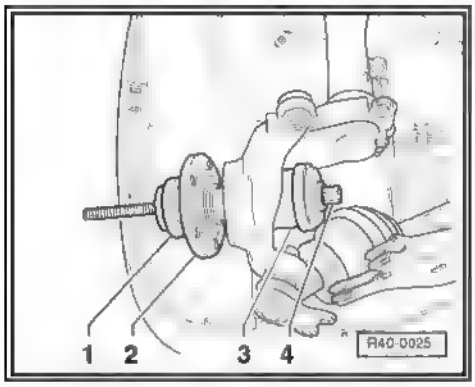
1 - Thrust pad -VW 442-

2 - Wheel hub

3 - Thrust pad -VW 472/1-

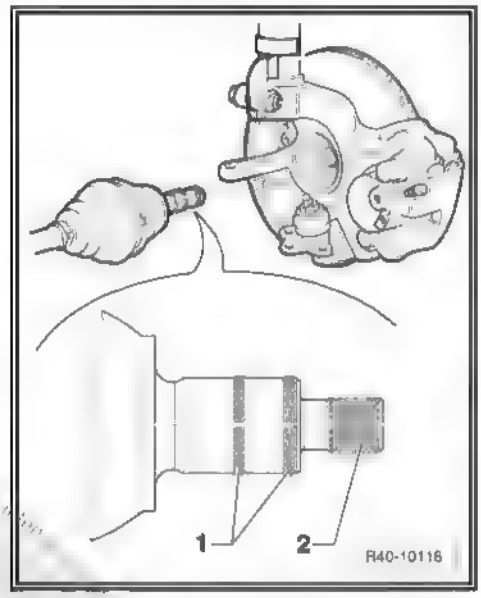
4 - Device -T 10030/3-

– Clean the surfaces from the thread and the toothed area.



– Lubricate the toothed area -1- and the thread -2- with Molybdenum Paste -G 052 751 A1- . Refer to the ⇒ Chemical material manual .

– Install the drive shaft in the wheel roller bearing.



Note

Check if the gaiters are not damaged or twisted.

– Fasten the swivel tip to the wishbone (screws on old marks). Tightening torque ⇒ Item 17 (page 8) .

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

– Install the disc protector, the brake disc and the disc brake caliper ⇒ Brake systems; Rep. Gr. 46 ; Front brakes - repair .

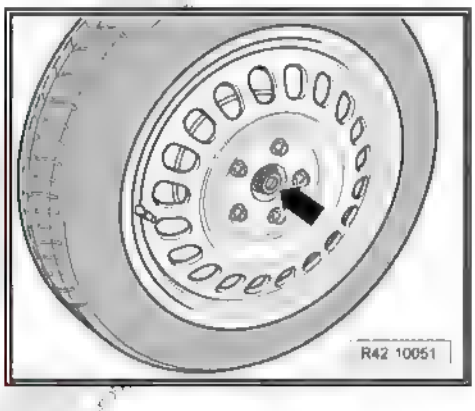
– Install the coupling rod.

– Install the wheels and tighten the screws ⇒ page 88 .

– Tighten the splined nut -arrow-.

- Vehicles with ABS brakes ⇒ Item 14 (page 28) .

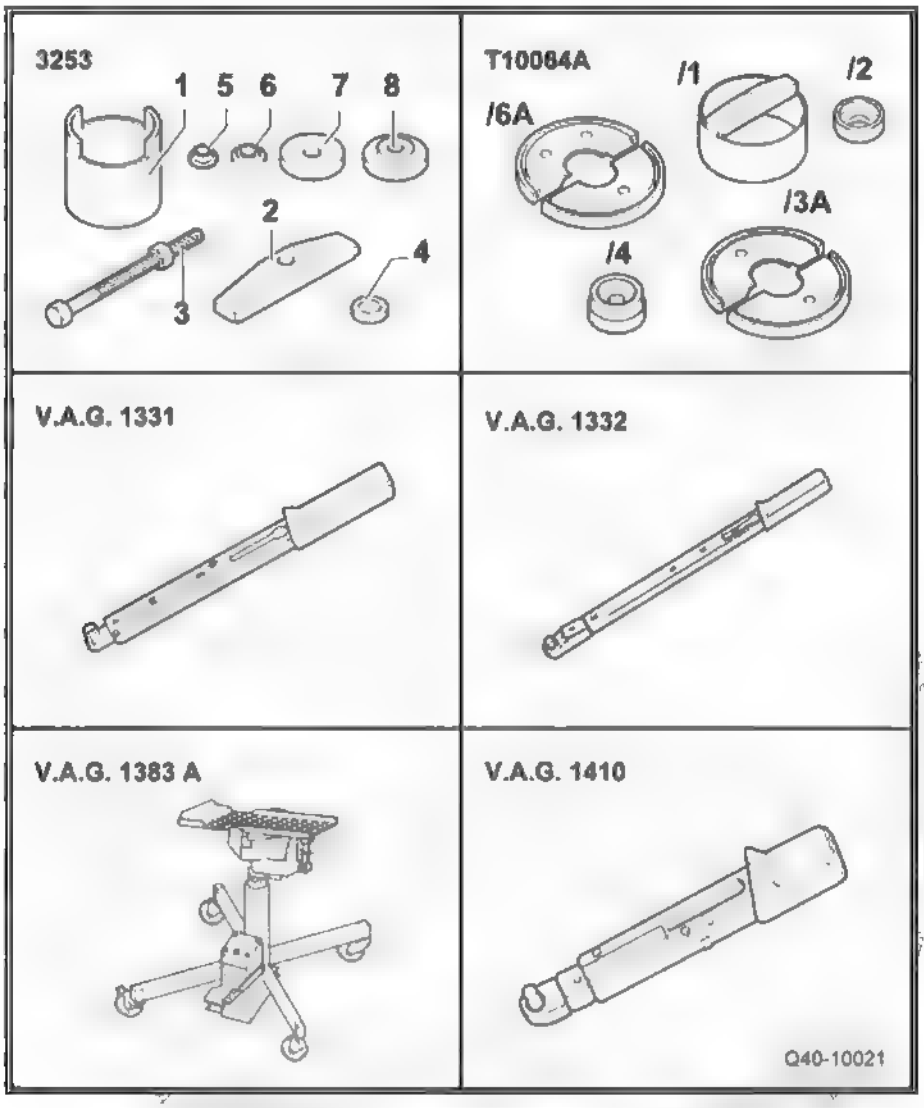
- Vehicles without ABS brakes ⇒ Item 13 (page 28) .



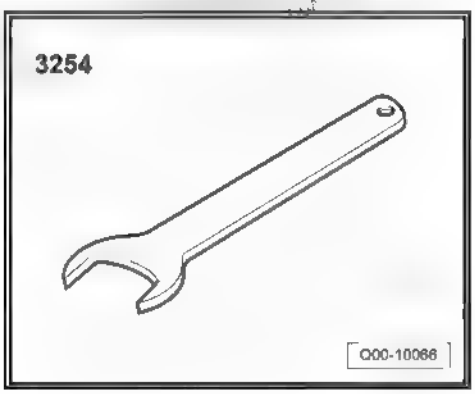
3.2 Front wheel hub with wheel roller bearing for 13" running gear - vehicles with ABS / ESP - remove and install

Special tools and workshop equipment required

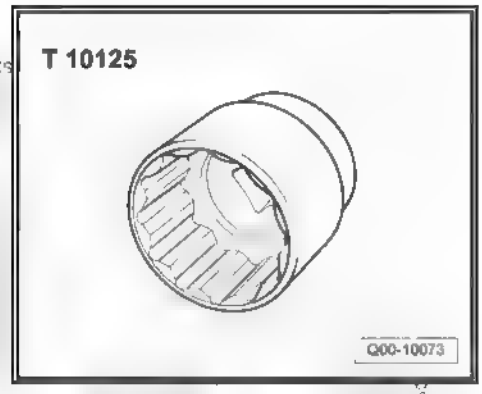
- Mounting device -3253-
- Assembly device -T10064-
- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- and Tray for engine jack EQ 7081 -VAG 1359/2-
- Torque wrench - 4 to 20 Nm (socket 3/8") -VAG 1410-



- Open-end spanner, 50 mm -3254-



♦ Similar - Gedore Ref D32-36 - Star socket 36mm -T10125-

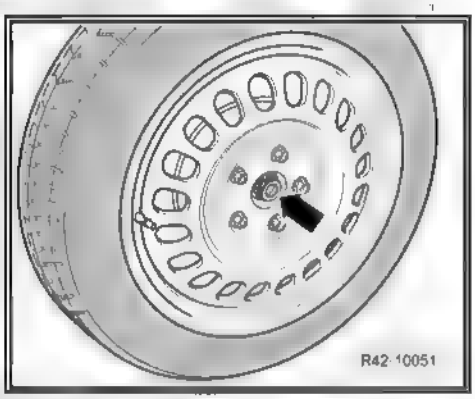


3.2.1 Removal

– Lift the vehicle until the front axle is without any load.

– Loosen the grooved nut -arrow- with the ?Star socket 36mm or Gedore Ref. D32-36 -T 10125- or the 30-mm star socket.

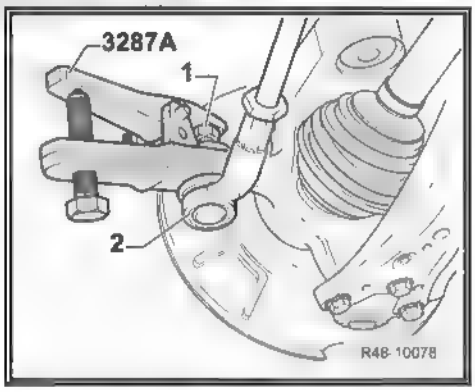
– Remove the wheel.



– Loosen the fastening nut -1- from the yoke.

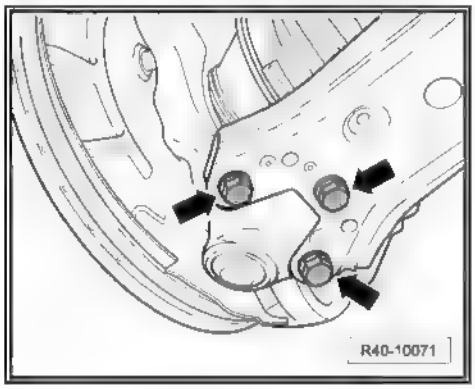
– Separate the steering yoke tip -2- from the wheel roller bearing case, by using the Extractor -3287 A- .

– Mark the position for the swivel tip screws on the wishbone.

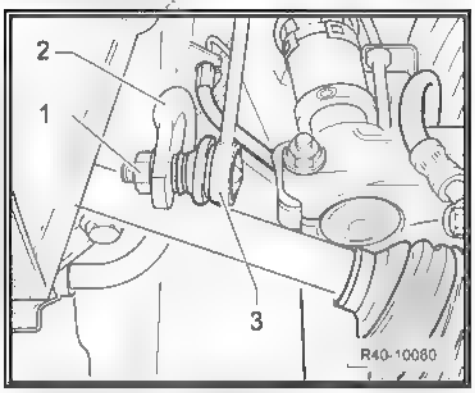


– Remove the attaching screws -arrows-.

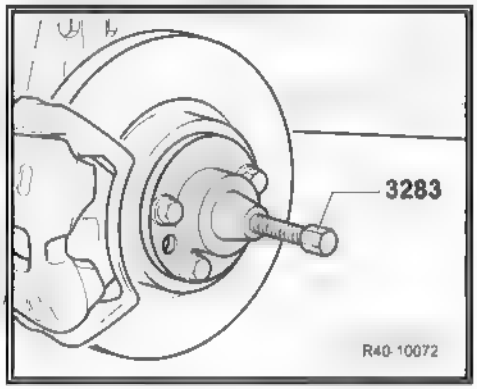
– Move the suspension column together with the swivel joint on the wishbone



- Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
- Remove the coupling rod -3- from the anti-roll bar -2-.



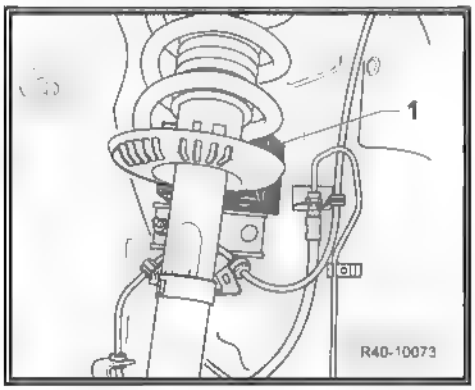
- Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.



Note

While pressing the drive axle shaft outwards, make sure you have enough free space.

- Remove the wheel roller bearing case with the shaft articulation out of the transverse arm.
- Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing.
- Fasten the drive axle shaft to the body with a wire.



Note

The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.

- Remove disc brake caliper and tie it to body with wire ⇒ Brake system; Rep. Gr. 46 ; Brakes - Mechanical systems .
- Remove the Phillips screw from the brake disc and remove the brake disc.
- Remove the cover plate.
- Remove the speed sensor from the wheel bearing case.

Note

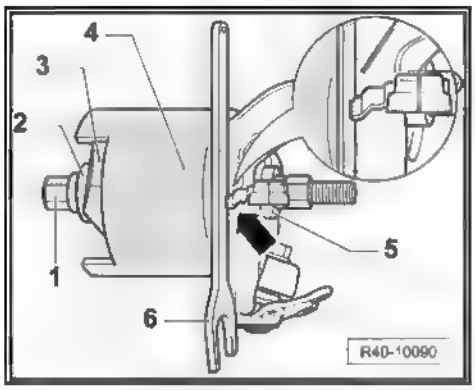
Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- underneath (danger of accident from falling parts when extracting the wheel hub and the wheel roller bearing)

3.2.2 Wheel hub with roller bearing - remove

– Install the detachment device -1- between the wheel roller bearing case and the wheel hub, and pre-tension it.

Installation position: Flat sides of plates face to wheel hub side

– Hold the device and remove the wheel hub with the wheel roller bearing



1 - Mounting device -3253/3-

2 - Mounting device -3253/5-

3 - Mounting device -3253/2-

4 - Mounting device -3253/1-

5 - Mounting device -3253/6-

6 - Open-end spanner, 50 mm -3254-

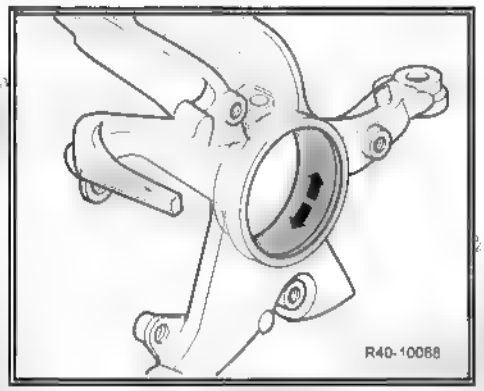
3.2.3 Wheel hub with roller bearing - install

– Remove residues from the drilling retaining washer and the wheel roller bearing case groove.

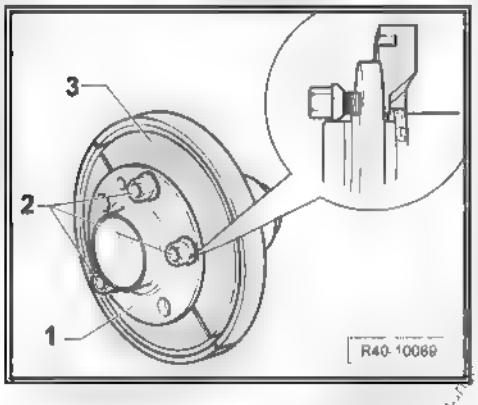
– Clean the suspension column hole.

– Lubricate the wheel roller bearing housing surface with the Molybdenum grease -G 052 723 A2- . Refer to the ⇒ Chemical material manual .

Use the Molybdenum grease -G 052 723 A2- . Refer to the ⇒ Chemical material manual .



– Install the claws from the Installation device -T10064/5- on the wheel hub with wheel roller bearing.



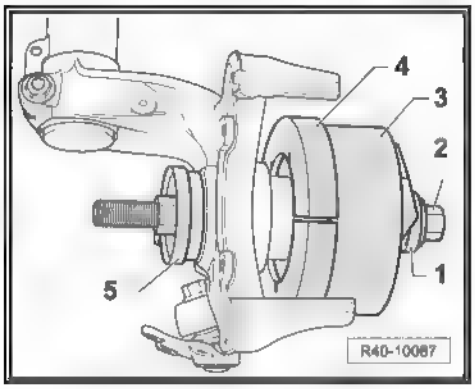
1 - Wheel hub with wheel bearing

2 - Wheel screws

3 - Assembly device -T 10064/5-

Screws from wheel -2- must not protrude from the back of claw of the Assembly device -T 10064/5- .

– Install the wheel hub with wheel roller bearing in the wheel roller bearing case.



Note

When installing, do not tilt the wheel hub with wheel roller bearing

– Install the wheel hub with wheel bearing until the retaining washer fits with an audible click

1 - Mounting device -3253/5-

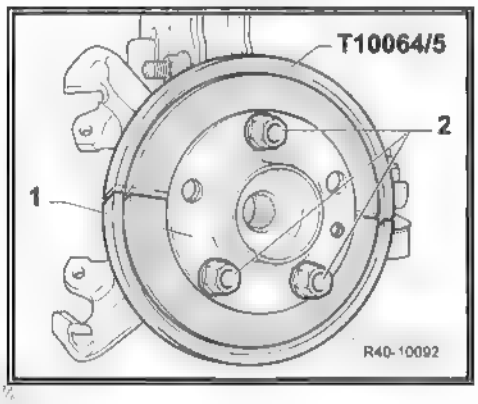
2 - Mounting device -3253/3-

3 - Assembly device -T 10064/1-

4 - Assembly device -T10064/5-

5 - Assembly device -T10064/4-

– Loosen the claws from the Assembly device -T10064/5- wheel hub with wheel bearing.

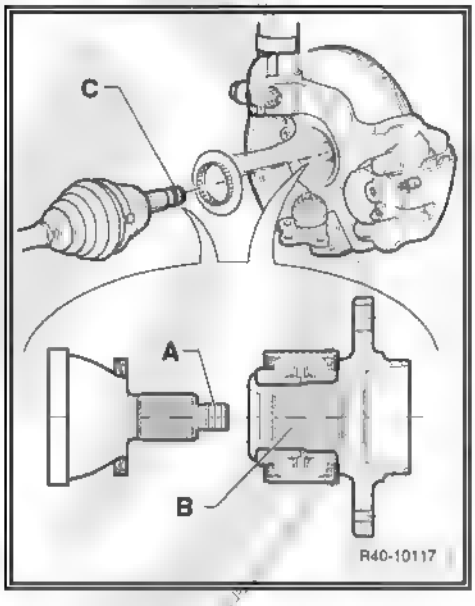


1 - Wheel hub with wheel bearing

2 - Wheel screws

Install the drive shaft in the wheel roller bearing as detailed below:

- Apply the Adhesive -D 185 400 A2- to the stub axle threads -A- or to the nut thread. Refer to the ⇒ Chemical material manual .
- Apply 2g of Adhesive -D 185 400 A2- to area -B-. Refer to the ⇒ Chemical material manual .
- The areas where the Adhesive -D 185 400 A2- should be free from grease, oil, water or any other type of material. Refer to the ⇒ Chemical material manual .
- Tighten the nut with 50 Nm.



WARNING

The torque must be applied within 2 minutes after inserting the shaft tip into the wheel hub. After the torque, the vehicle must remain at least 1.5 hours with no strain on the semi-shaft.

- Fasten the swivel tip to the wishbone (screws on old marks). Tightening torque ⇒ Item 17 (page 8) .

Note

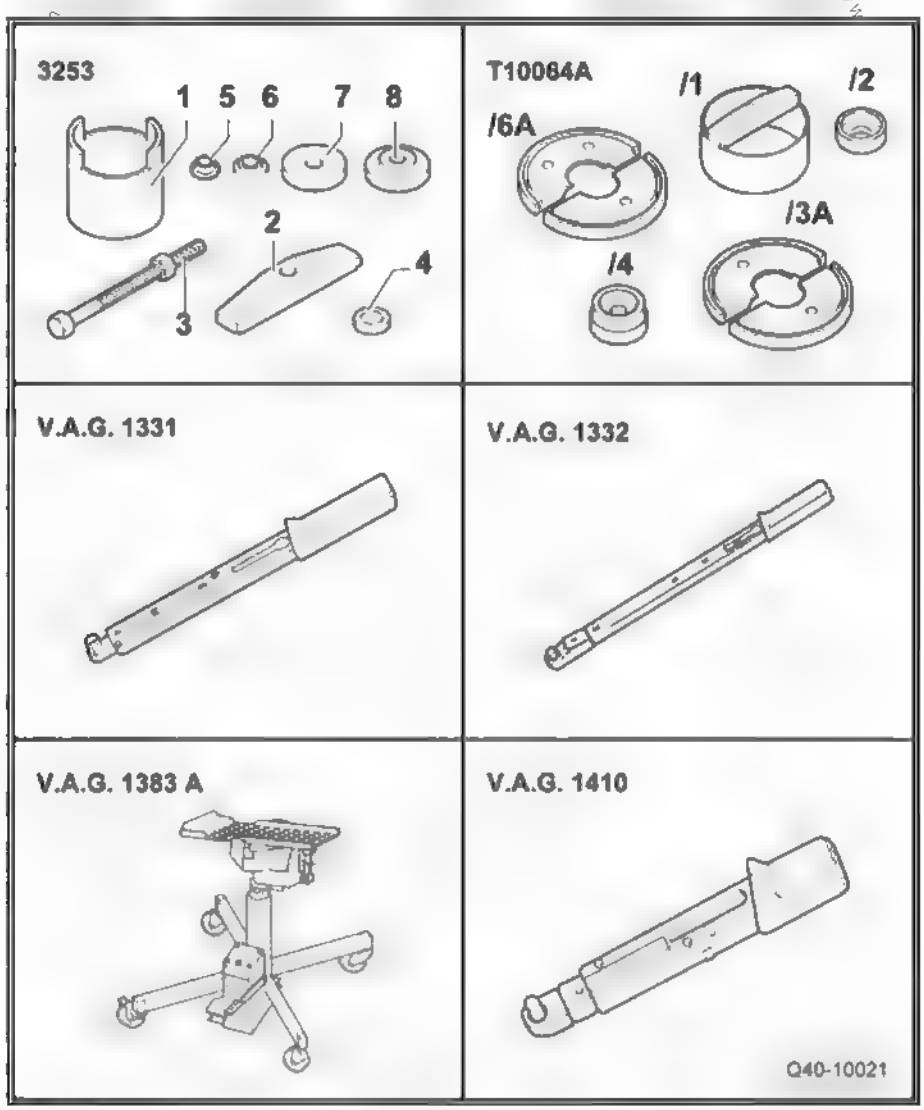
Check if the bellows are not damaged or twisted

- Install the disc protector, brake disc and disc brake caliper. Please refer to manual ⇒ Brake system; Rep. Gr. 46 ; Brakes - Mechanical systems .
- Install the wheels and tighten the screws ⇒ page 88 .

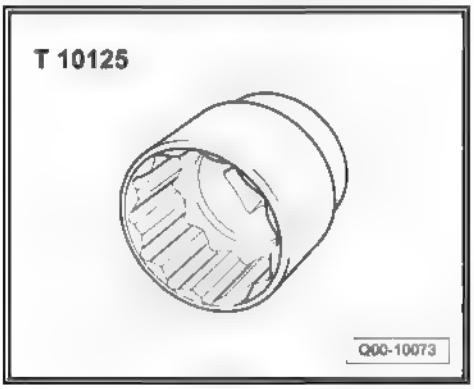
3.3 Front wheel hub with wheel roller bearing for 14" and 15" running gears - remove and install

Special tools and workshop equipment required

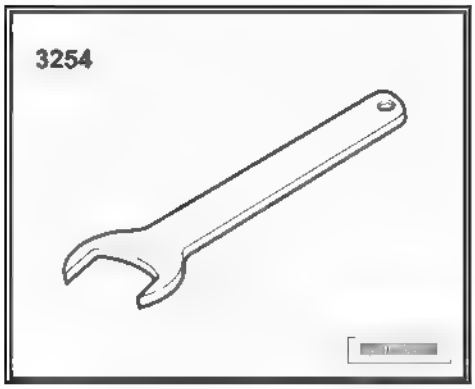
- Mounting device -3253-
- Assembly device -T 10064-
- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- and Tray for engine jack EQ 7081 -VAG 1359/2-
- Torque wrench - 4 to 20 Nm (socket 3/8") -VAG 1410-



- ?Star socket 36mm or Gedore Ref. D32-36 -T 10125-



♦ Open-end spanner, 50 mm -3254-

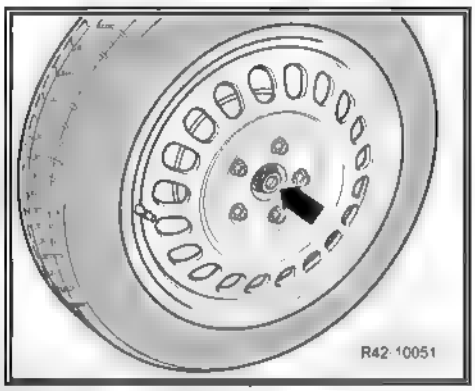


3.3.1 Removal

– Lift the vehicle until the front axle is without any load.

– Loosen the grooved nut -arrow- with the ?Star socket 36mm or Gedore Ref. D32-36 -T 10125- or the 30-mm star socket.

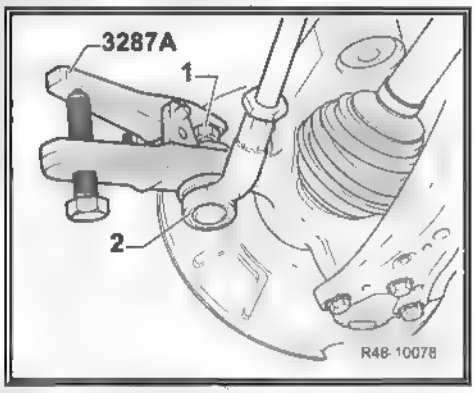
– Remove the wheel.



– Loosen the fastening nut -1- from the yoke.

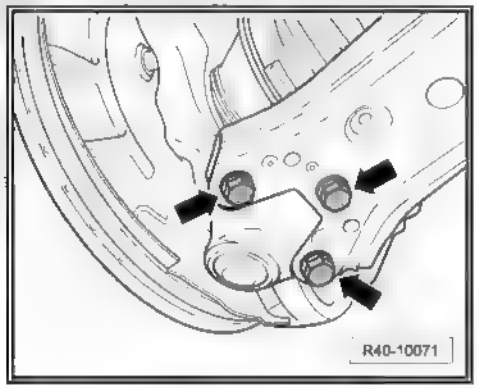
– Separate the steering yoke tip -2- from the wheel roller bearing case, by using the Extractor -3287 A- .

– Mark the position for the swivel tip screws on the wishbone.

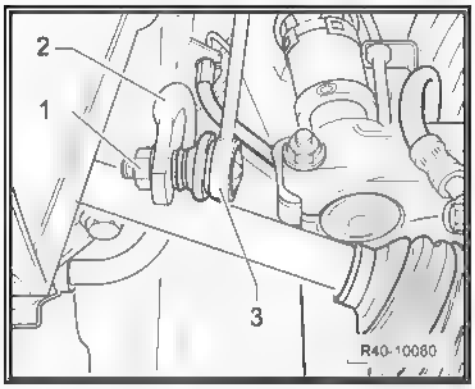


– Remove the attaching screws -arrows-.

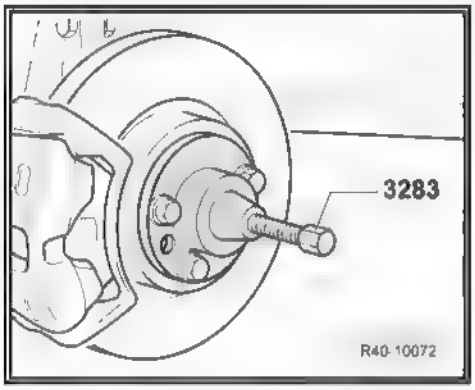
– Move the suspension column together with the swivel joint on the wishbone.



- Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
- Remove the coupling rod -3- from the anti-roll bar -2-.



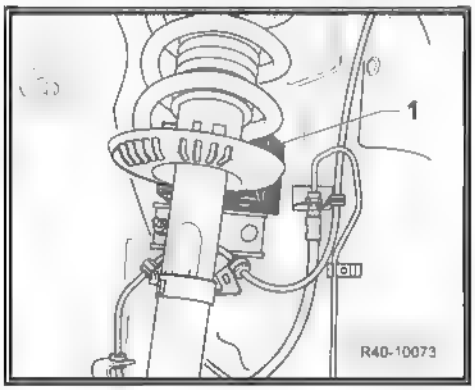
- Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.



Note

While pressing the drive axle shaft outwards, make sure you have enough free space.

- Remove the wheel roller bearing case with the shaft articulation out of the transverse arm.
- Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing.
- Fasten the drive axle shaft to the body with a wire.



Note

The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.

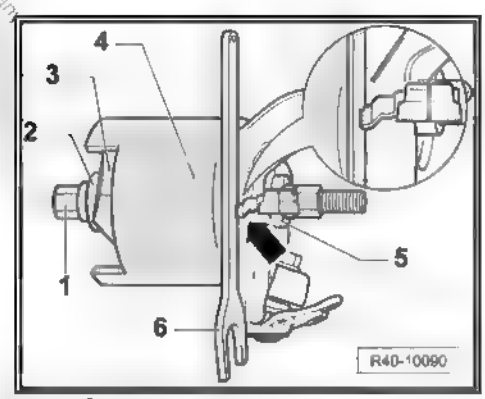
- Remove the break support with the disc break caliper, or only the disc break caliper, and fasten to the body with a wire ⇒ Brake system; Rep. Gr. 46 ; Brakes - Mechanical systems .
- Remove the Phillips screw from the brake disc and remove the brake disc.
- Remove the cover plate.
- Remove the speed sensor from the wheel bearing case.

Note

Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- underneath (danger of accident from falling parts when extracting the wheel hub and the wheel roller bearing).

3.3.2 Hub with wheel bearing - remove

– Install the detachment device -1- between the wheel bearing case and the wheel hub and pretension it



Installation position: Flat plate surfaces to the wheel hub side

– Firmly ??hold the device and remove the wheel hub with the wheel bearing.

1 - Mounting device -3253/3-

2 - Mounting device -3253/5-

3 - Mounting device -3253/2-

4 - Mounting device -3253/1-

5 - Mounting device -3253/6-

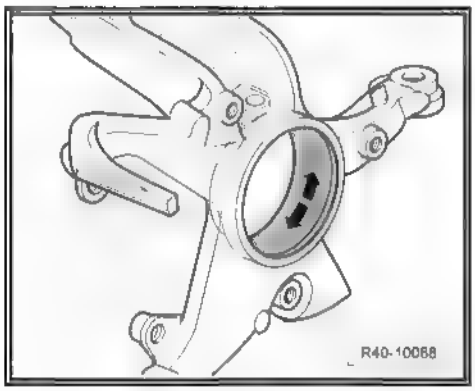
6 - Open-end spanner, 50 mm -3254-

3.3.3 Wheel hub with wheel bearing - install

– Remove residues from the drilling retaining washer and the wheel roller bearing case groove.

– Clean the suspension column hole.

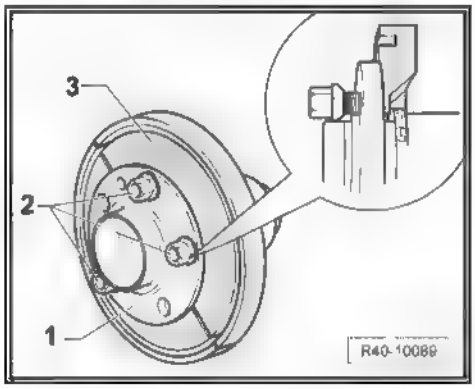
– Lubricate the wheel roller bearing housing surface with the Molybdenum grease -G 052 723 A2- . See the ⇒ Chemical material manual .



Use the Molybdenum grease -G 052 723 A2- . Refer to the ⇒ Chemical material manual .

Use the grease from the repair kit.

– Install the claws from the Installation device -T10064/6A- on the wheel hub with wheel roller bearing.



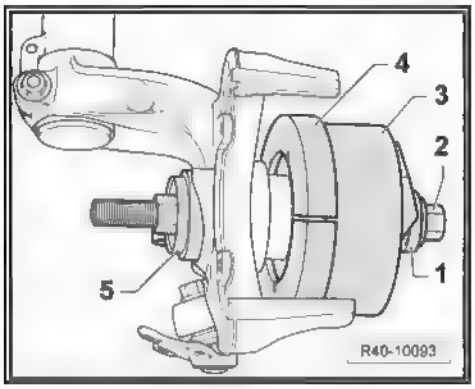
1 - Wheel hub with wheel bearing

2 - Wheel screws

3 - Assembly device -T10064/6A-

Screws from wheel -2- must not protrude from the back of claw of the Assembly device -T10064/6A- .

– Install the wheel hub with the wheel bearing on the wheel bearing case.



Note

When installing, do not tilt the wheel hub with wheel roller bearing

– Install the wheel hub with wheel bearing until the retaining washer fits with an audible click.

1 - Mounting device -3253/5-

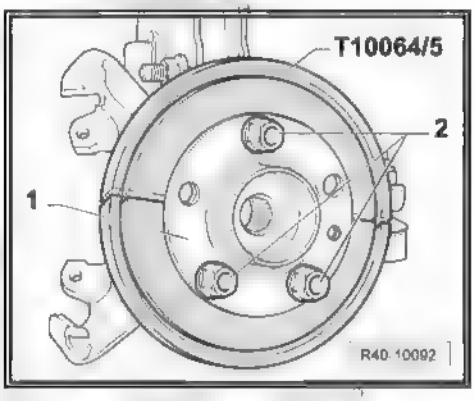
2 - Mounting device -3253/3-

3 - Assembly device -T 10064/1-

4 - Assembly device -T10064/6A-

5 - Assembly device -T10064/4-

– Loosen the claws from the installation device -T10064/6A- wheel hub with wheel bearing.



1 - Wheel hub with wheel bearing

2 - Wheel screws

– Install the drive shaft in the wheel roller bearing.

Note

Check if the gaiters are not damaged or twisted.

– Fasten the swivel tip to the wishbone (screws on old marks). Tightening torque ⇒ Item 17 (page 8) .

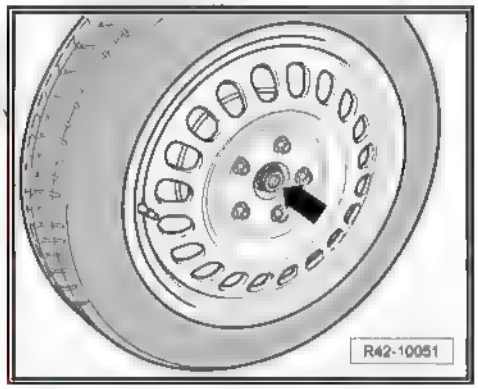
– Install the disc protector, the brake disc and the brake support with the disc brake caliper, or only the disc brake caliper. Please refer to manual ⇒ Brake system; Rep. Gr. 46 ; Brakes - Mechanical systems .

– Install the wheels and tighten the screws ⇒ page 88 .

– Tighten the splined nut -arrow -.

- Vehicles with ABS brakes ⇒ Item 14 (page 28) .

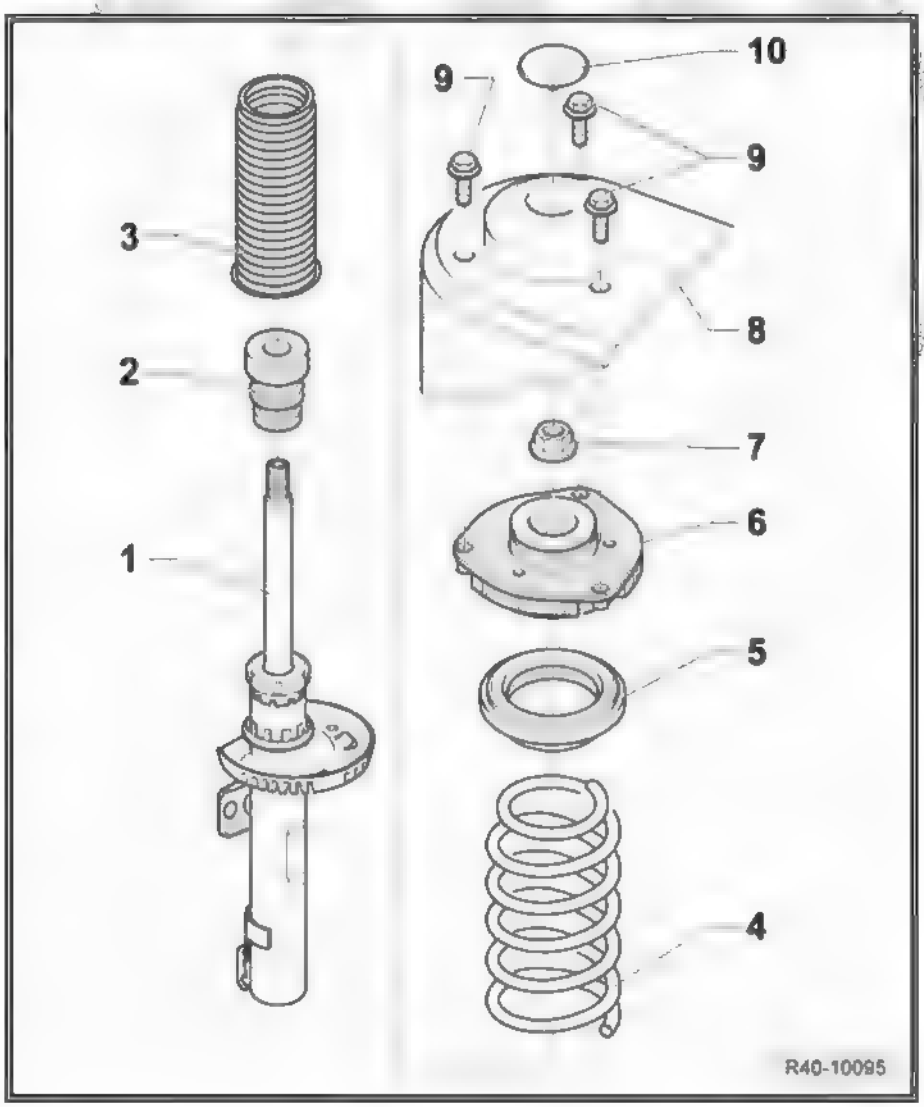
- Vehicles without ABS brakes ⇒ Item 13 (page 28) .



4 III - Front suspension pillar - assembly overview

WARNING

At a same vehicle, only shock absorbers from the same brand must be used.



1 - Damper
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

WARNING

At a same vehicle, only shock absorbers from the same brand must be used.

2 - Stopper

3 - Damper dust boot

4 - Coil spring
- ❑ remove and install ⇒ page 52
- ❑ observe the color coding
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

Spring allocation via PR number

These numbers are indicated on the vehicle data plate

Example ⇒ page 47
- ❑ the external spring surface must not be damaged

5 - Axial ball bearing

6 - Suspension pillar support

7 - Self-locking hexagon nut
- ❑ 60 Nm
- ❑ replace after each removal

8 - Suspension pillar turret

9 - Hexagon screw
- ❑ 15 Nm + 90°
- ❑ replace after each removal

10 - Cover

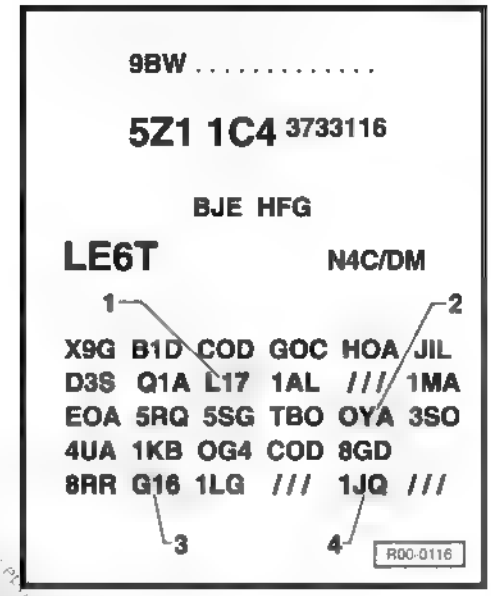
4.1 Vehicle identification label

The vehicle ID label is located in the spare wheel housing and in the Maintenance and Warranty book.

Numbers -1. . . 4- give information on the coil springs and shock absorbers installed in the respective vehicle.

The corresponding spring installed in the vehicle is indicated on the vehicle identification label, documented by the respective PR number of the weight class.

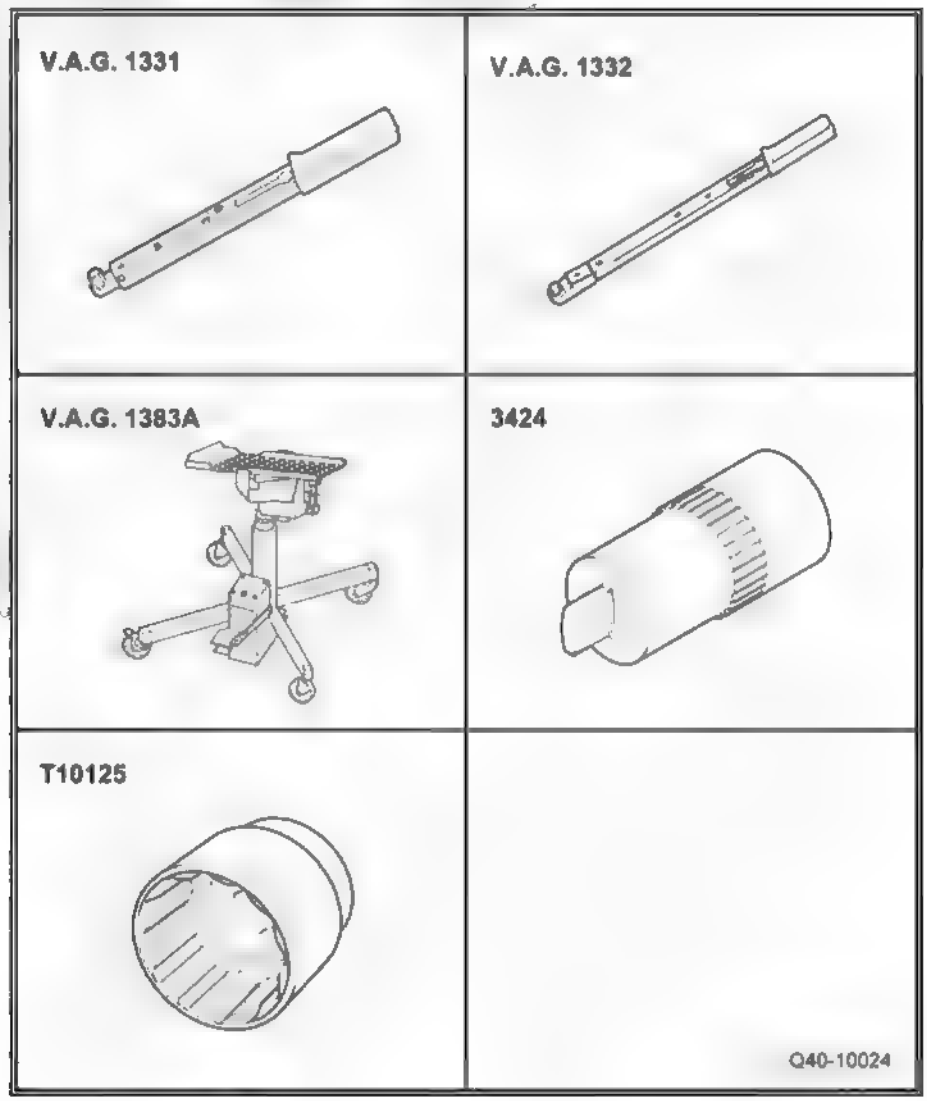
Based on this PR number, the matching between the respective spring and the vehicle can be made from the Replacement Parts Catalogue/ETKA.



4.2 Suspension column - remove and install

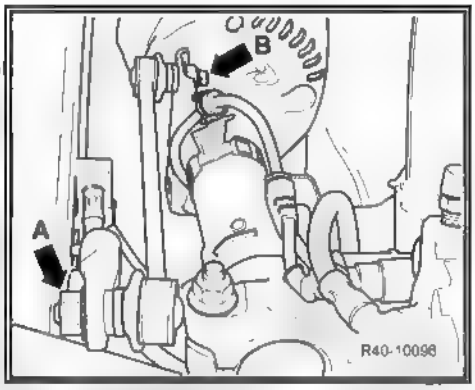
Special tools and workshop equipment required

- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200Nm (socket 1/2")" -VAG 1332-
- Tray for engine jack EQ 7081 -VAG 1359/2- and Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-
- Spreader -3424-
- ?Star socket 36mm or Gedore Ref. D32-36 -T 10125-

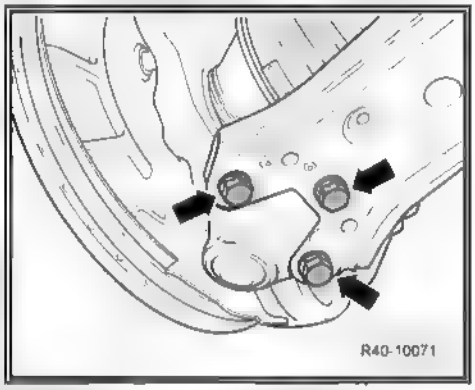


4.2.1 Removal

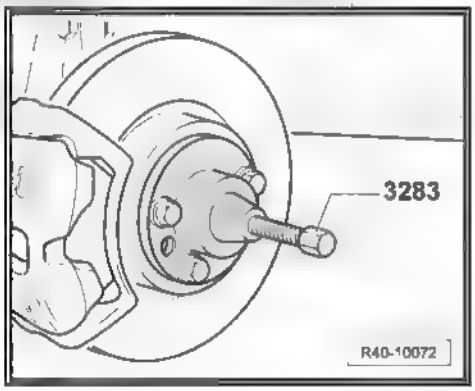
- Lift the vehicle until the front axle is without any load
- Loosen the grooved nut -arrow- with the Star socket 36mm or Gedore Ref D32-36 -T 10125- or the 30 mm star socket
- Remove the wheel.
- Release upper hexagon nut from the coupling rod -arrow B- from the suspension pillar.
- Release the speed sensor cable from the suspension column.
- Mark the position for the swivel tip screws on the wishbone.



- Remove screws -arrows-.
- Move the suspension column together with the swivel joint on the wishbone.



- Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.

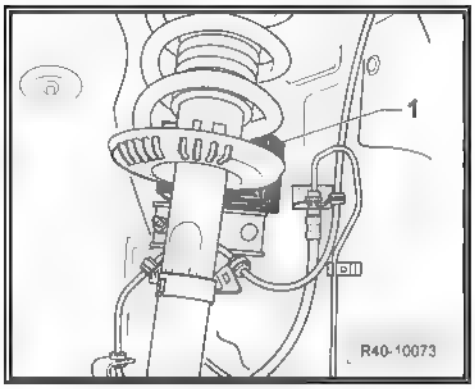


Note

While pressing the drive axle shaft outwards, make sure you have enough free space.

- Remove the wheel roller bearing case with the shaft articulation out of the transverse arm

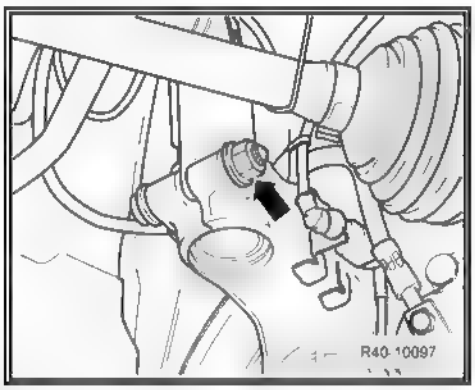
- Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing
- Fasten the drive axle shaft to the body with a wire.



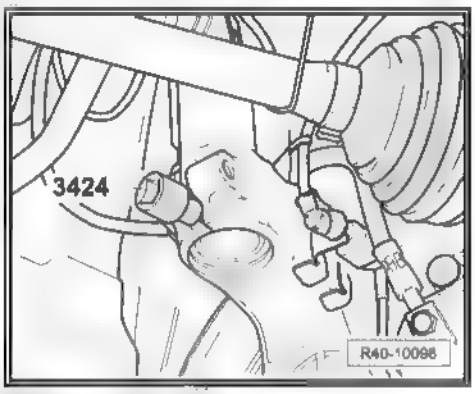
Note

The drive shaft shall not hang, once the inner articulation can be damaged due to excessive tilting

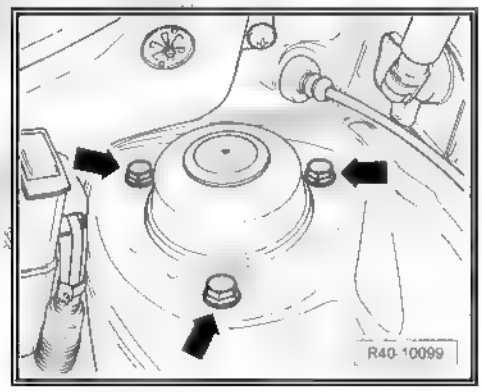
- Release the swivel joint from the support arm
- Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- under the wheel bearing case.
- Loosen the nut that connects the wheel roller bearing case to the suspension column -arrow-.



- Install the Spreader -3424- in the slot.
- Turn the ratchet 90° and remove it from the Spreader -3424- .
- Press the brake disc toward the suspension column manually.
- Otherwise, the shock absorber tube could incline into the hole in the wheel roller bearing case.
- Remove the wheel bearing case from under the shock absorber tube and lower it, with the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- until the shock absorber tube can be freely moved.
- Fasten the wheel roller bearing case on the console/subframe by using a wire.
- Remove the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- in the wheel roller bearing case.



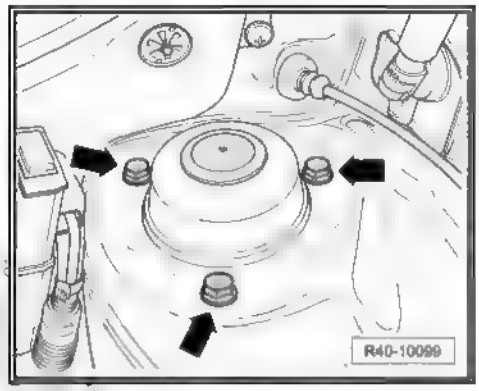
Remove hexagon screws -arrows- from upper fastening of shock absorber and remove the suspension pillar.



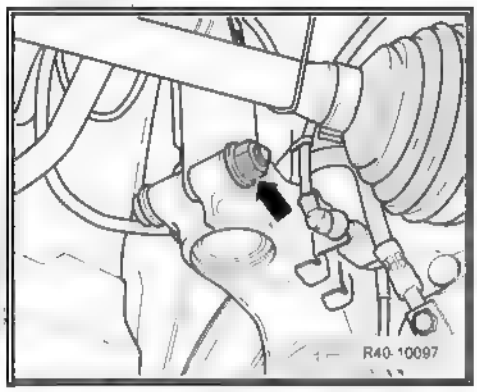
4.2.2 Installation

- Install the suspension pillar.

Remove the hex head screws -arrows- from the shock absorber upper fastening ⇒ Item 9 (page 46) .



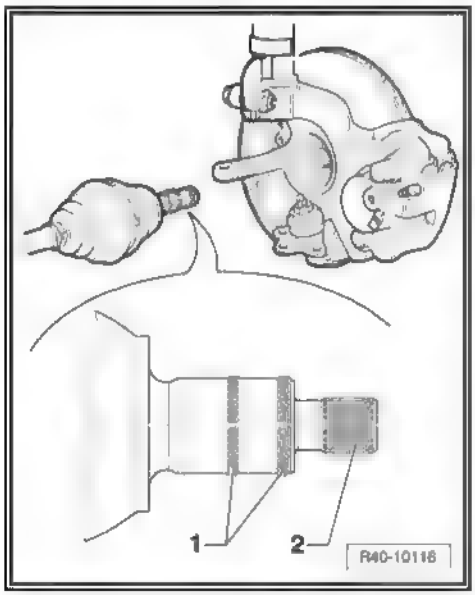
- Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- under the wheel bearing case
- Place the suspension pillar on wheel bearing case.
- Removing the wire from the wheel bearing case.
- Using the Engine and gearbox jack + gearbox or EQ 7081 - VAG 1383A- , lift the wheel roller bearing case carefully until you are able to install the screws for the suspension column/ wheel bearing case.
- While lifting the support, press the brake disc toward the suspension column manually.
- Otherwise, the shock absorber tube could incline into the hole in the wheel roller bearing case.
- Remove the Spreader -3424- .
- Tighten the nut -arrow- from the screwed connection of the wheel roller bearing case/suspension column ⇒ Item 7 (page 27) .
- Install the wheel roller bearing case with the swivel tip in the wishbone.



Only for vehicles without ABS

Clean threaded and indented surfaces. The cleaned areas must be free of oil and grease.

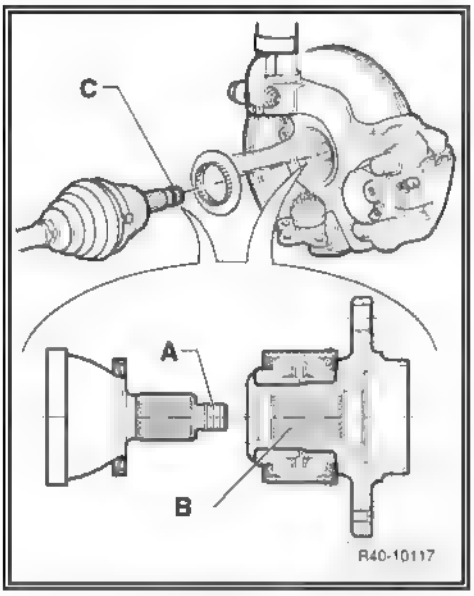
- Apply to the splines-1- (bead diameter 2mm) and the thread -2- (and all around) Adhesive -D 185 400 A2- as indicated in the illustration. Refer to the ⇒ Chemical material manual .



Only for vehicles with 13" running gear with ABS/ESP

Install the articulated shaft on the wheel bearing as follows:

- Apply the Adhesive -D 185 400 A2- to the stub axle threads -A- or to the nut thread. Refer to the ⇢ Chemical material manual .
- Apply 2g of Adhesive -D 185 400 A2- to area -B-. Refer to the ⇒ Chemical material manual .
- The areas where the Adhesive -D 185 400 A2- should be free from grease, oil, water or any other type of material. Refer to the ⇒ Chemical material manual
- Tighten the nut with 50 Nm.

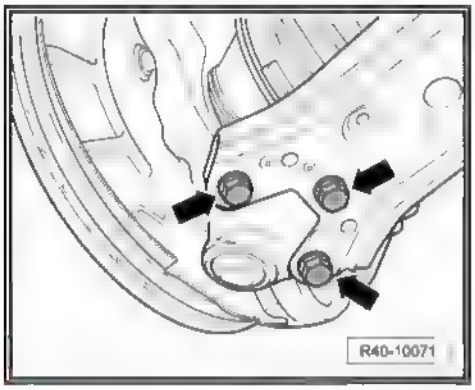


WARNING

The torque must be applied within 2 minutes after inserting the shaft tip into the wheel hub. After the torque, the vehicle must remain at least 1,5 hours with no strain on the semi-shaft.

Continuation for all vehicles:

- Install the screws -arrows- in the previous made markings. Tightening torque ⇒ Item 17 (page 8) .



Note

- *Use new screws!*
- *Check if the bellows are not damaged or twisted*

Install by inverting the removal sequence.

- Fit wheel and tighten screws ⇒ page 88 .
- Tighten the grooved nut:

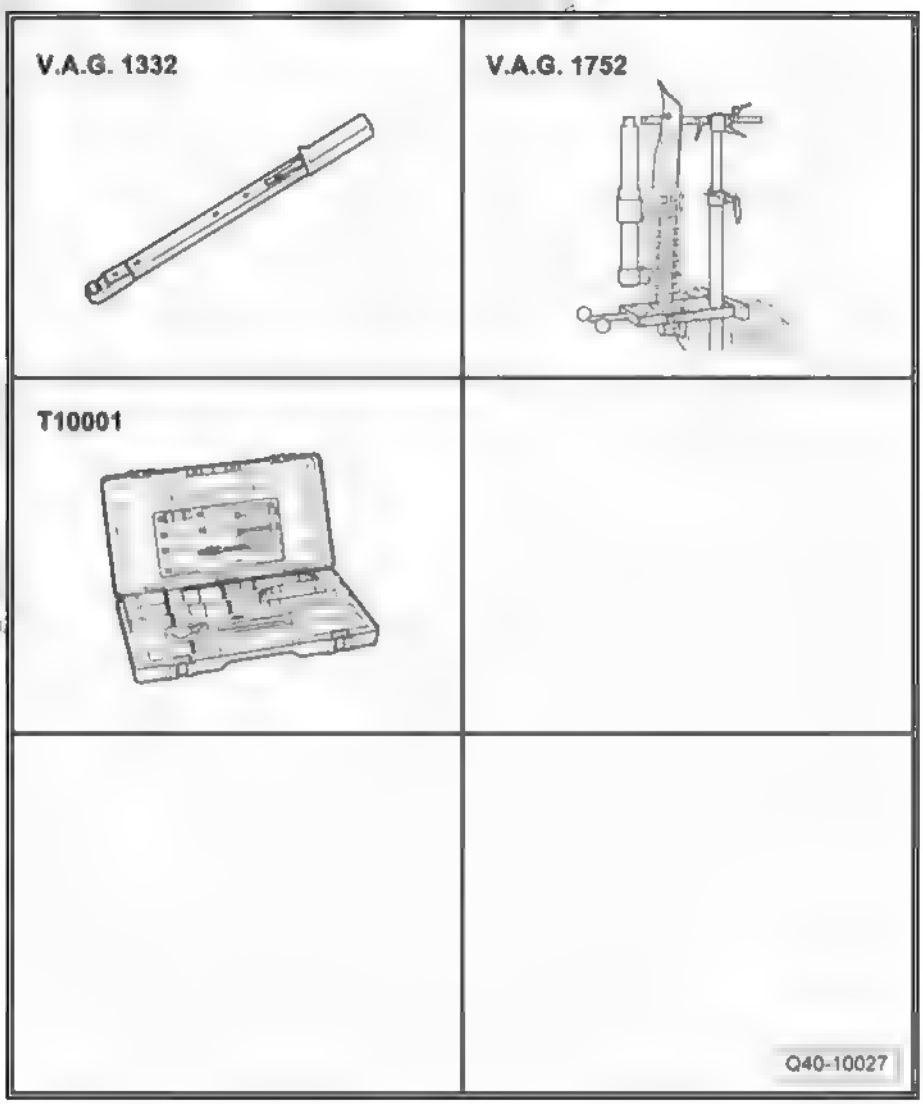
- Vehicles with ABS brakes ⇒ Item 14 (page 28) .

- Vehicles without ABS brakes. ⇒ Item 13 (page 28) .

4.3 Front suspension spring - repair

Special tools and workshop equipment required

- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Compression device or VW 5340 -VAG 1752/1- and Spring support -VAG 1752/4-
- Keys -T 10001-



4.3.1 Coil spring - remove

– Remove suspension pillar ⇒ page 47 .

- Compress the coil spring, using the Compression device or VW 5340 -VAG 1752/1- until upper portion of axial ball bearing is free.
- Remove the hexagon nut from the damper rod.
- Remove individual parts of suspension strut and coil spring with Compression device or VW 5340 -VAG 1752/1- .

1 - "Torquemeter - 40 to 200Nm (socket 1/2")" -VAG 1332-

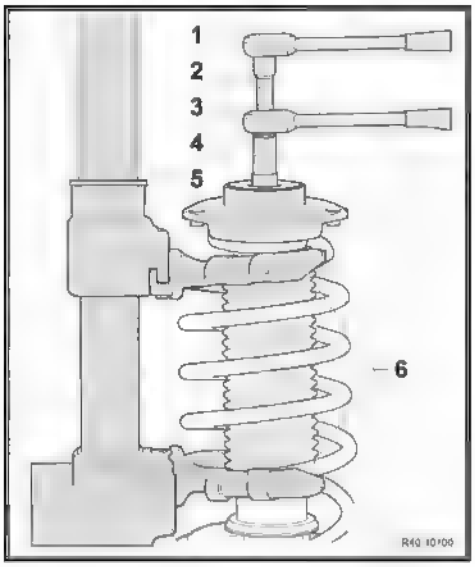
2 - Keys -T10001/8-

3 - Keys -T10001/11-

4 - Keys -T10001/5-

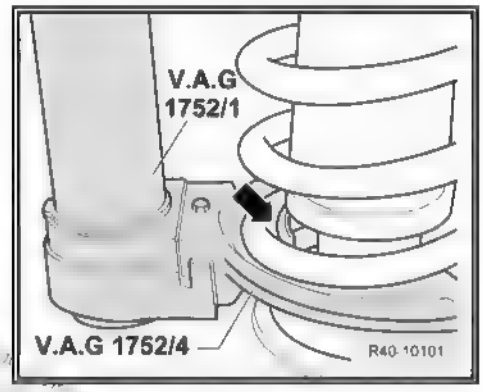
5 - Compression device or VW 5340 -VAG 1752/1-

6 - Spring support -VAG 1752/4-



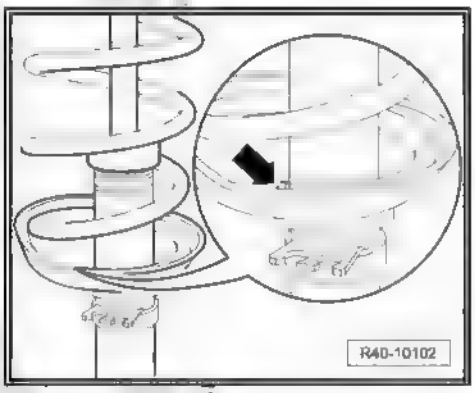
> **WARNING**
>
> *Initially, tension the spring until the upper spring plate pressure is relieved.*

- Ensure coil spring is correctly fit in Spring support -VAG 1752/4- -arrow-.



4.3.2 Coil spring - install

- Fit coil spring into lower spring support with Compression device or VW 5340 -VAG 1752/1- .
- The end of the coil spring must touch the stop -arrow-.
- Tighten new hexagonal nut on the shock absorber rod ⇒ Item 7 (page 46) .
- Release the Compression device or VW 5340 -VAG 1752/1- and remove it from coil spring.
- Install suspension pillar ⇒ page 47 .



5 Drive shafts - repair

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

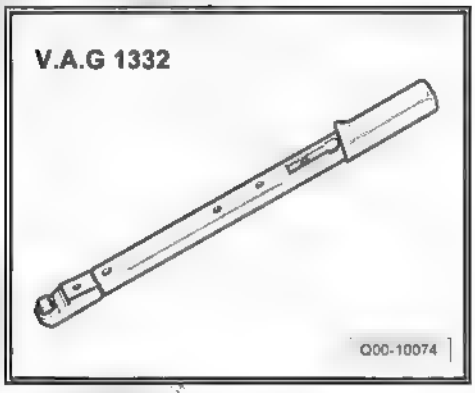
Note

The only operations authorized by Volkswagen engineering division are the replacement of (external or internal) drive shafts and replacement of the respective cauls.

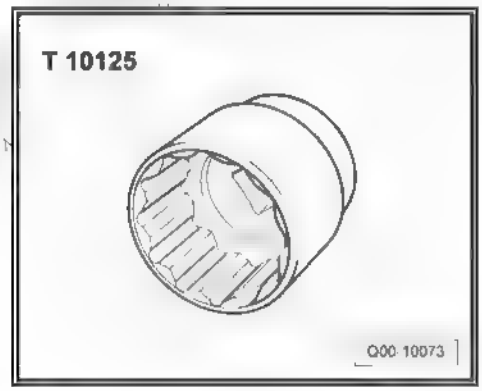
5.1 Drive shafts - remove and install

Special tools and workshop equipment required

- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-



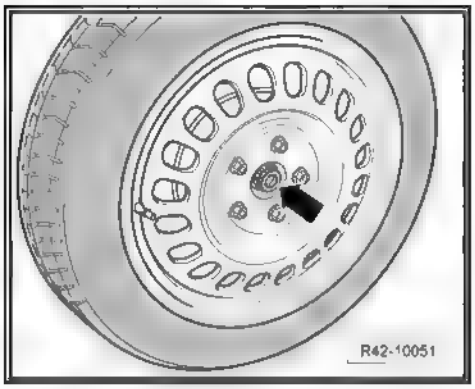
- Star socket 36mm or Gedore Ref. D32-36 -T 10125-



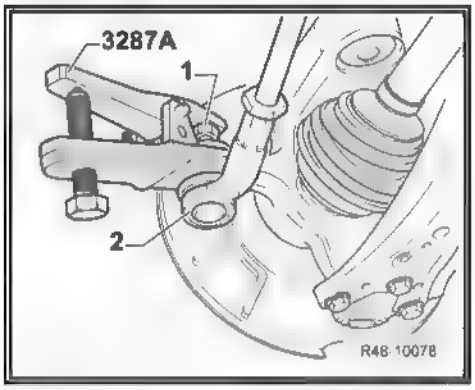
5.1.1 Removal

– Lift the vehicle until the front axle is without any load.

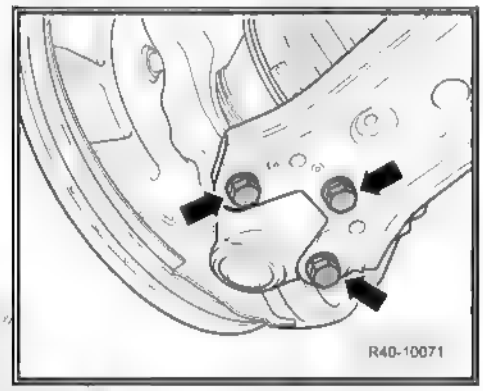
- Loosen the grooved nut -arrow- with the Star socket 36mm or Gedore Ref D32-36 -T 10125- or the 30-mm star socket
- Remove the wheel



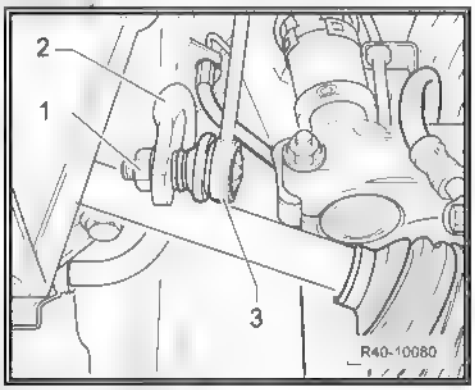
- Loosen the fastening nut -1- from the yoke.
- Separate the steering yoke tip -2- from the wheel roller bearing case, by using the Extractor -3287 A- .
- Mark the position for the swivel tip screws on the wishbone.



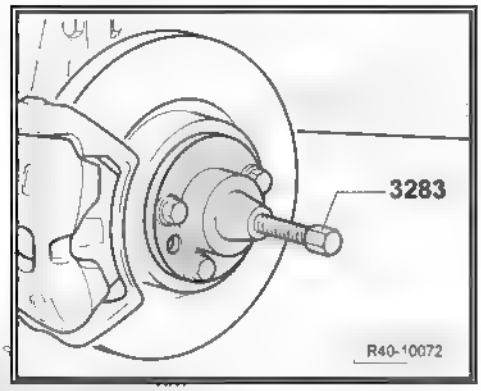
- Remove the attaching screws -arrows-.
- Move the suspension column together with the swivel joint on the wishbone.



- Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
- Remove the coupling rod -3- from the anti-roll bar -2-.



– Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration



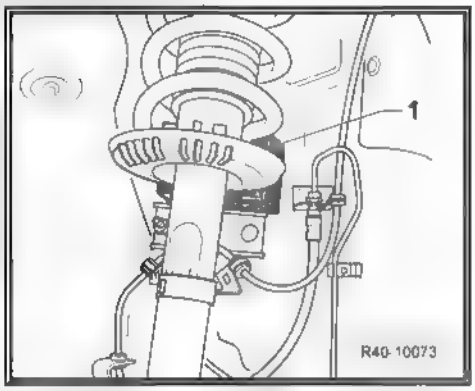
Note

While pressing the drive axle shaft outwards, make sure you have enough free space.

– Remove the wheel roller bearing case with the shaft articulation out of the transverse arm

– Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing

– Fasten the drive axle shaft to the body with a wire.



Note

The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.

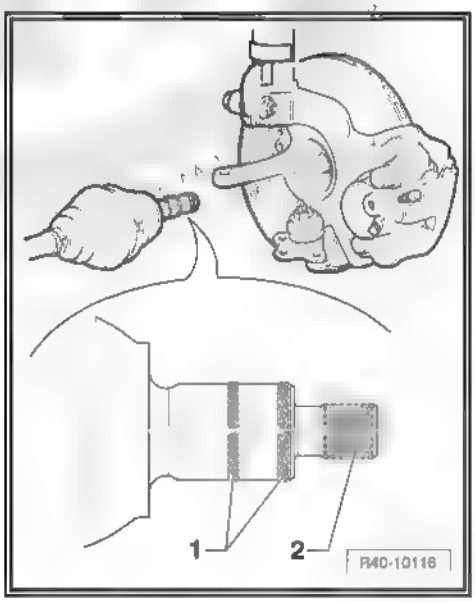
5.1.2 Installation

Remove any paint residue and/or corrosion on threads/splines of outer homokinetic articulation.

Only for vehicles without ABS

– Clean threaded and indented surfaces.

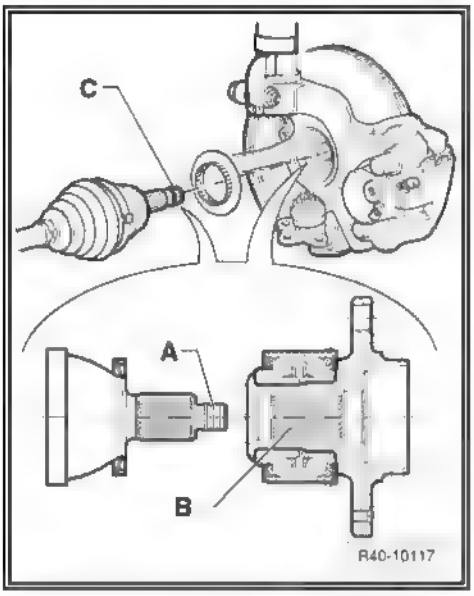
– Lubricate the toothed area -1- and the thread -2- with Molybdenum Paste -G 052 751 A1- . Refer to the ⇒ Chemical material manual .



Only for vehicles with 13" running gear with ABS/ESP

Install the drive shaft in the wheel roller bearing as detailed below:

- Apply the Adhesive -D 185 400 A2- to the stub axle threads -A- or to the nut thread. Refer to the ⇢ Chemical material manual .
- Apply 2g of Adhesive -D 185 400 A2- to area -B-. Refer to the ⇢ Chemical material manual .
- The areas where the Adhesive -D 185 400 A2- should be free from grease, oil, water or any other type of material.
- Tighten the nut with 50 Nm



WARNING

The torque must be applied within 2 minutes after inserting the shaft tip into the wheel hub. After the torque, the vehicle must remain at least 1.5 hours with no strain on the semi-shaft.

Continued for all vehicles

- Install the drive shaft in the wheel roller bearing.

Note

Check if the bellows are not damaged or twisted

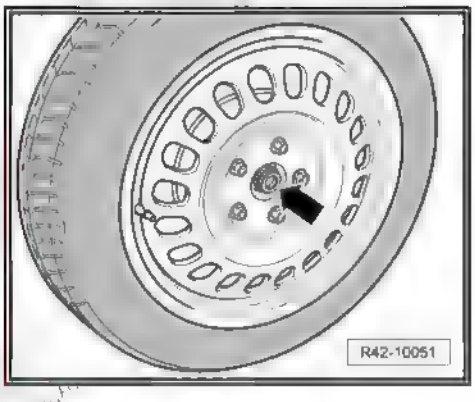
- Fit the outer homokinetic articulation into the wheel hub splines as far as possible.
- Fasten the swivel tip to the wishbone (screws on old marks). Tightening torque ⇒ Item 17 (page 8) .

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

- Install the inner homokinetic articulation and firstly tighten the bolts crosswise with 10 Nm.
- Tighten the internal grooved screws in a cross pattern, to the torque specified ⇒ Item 12 (page 61) .
- Install the wheels and tighten the screws ⇒ page 88 .
- Tighten the splined nut -arrow-.

- Vehicles with ABS brakes ⇒ Item 14 (page 28) .
- Vehicles without ABS brakes ⇒ Item 13 (page 28) .



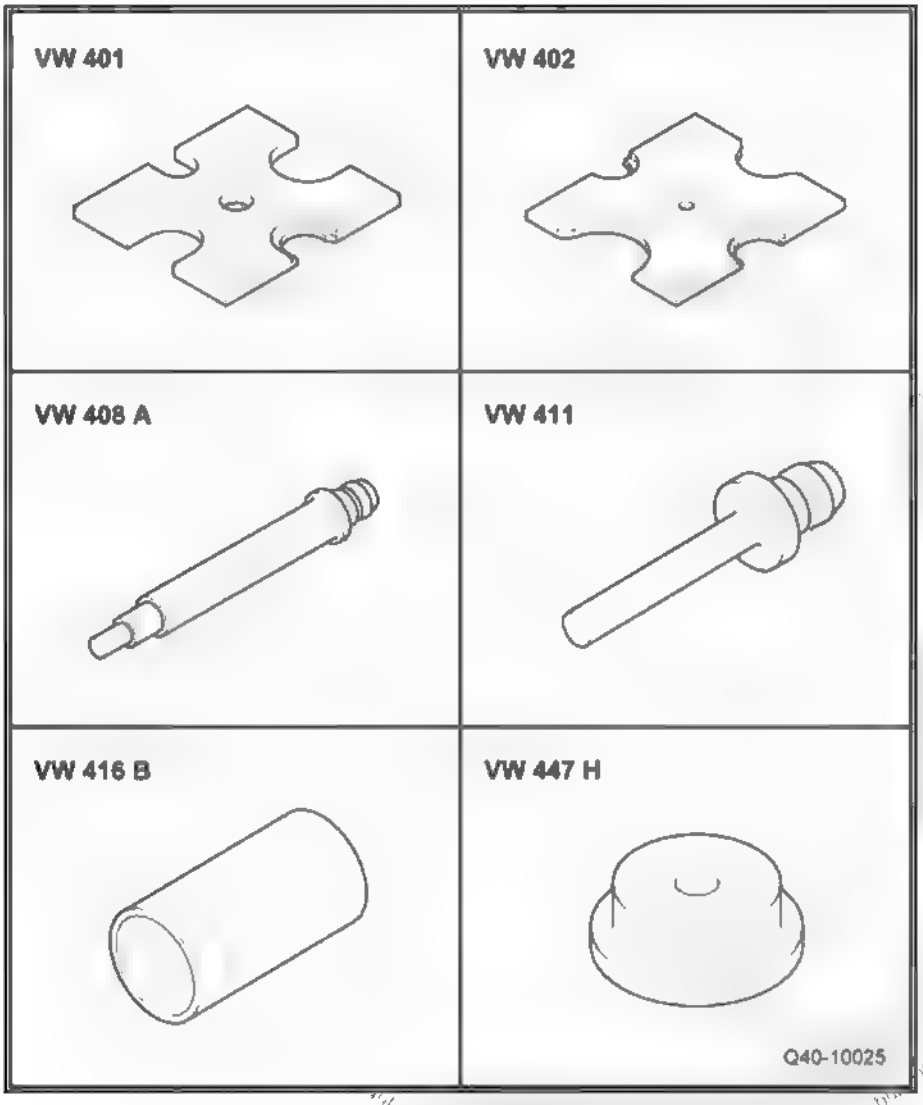
6 IV - Drive shafts with constant-velocity joints - repair

WARNING

- *Always replace self-locking nuts and screws which were subjected to angular torque.*
- *The only operations authorized by Volkswagen engineering division are the replacement of (external or internal) drive shafts and replacement of the respective cauls.*

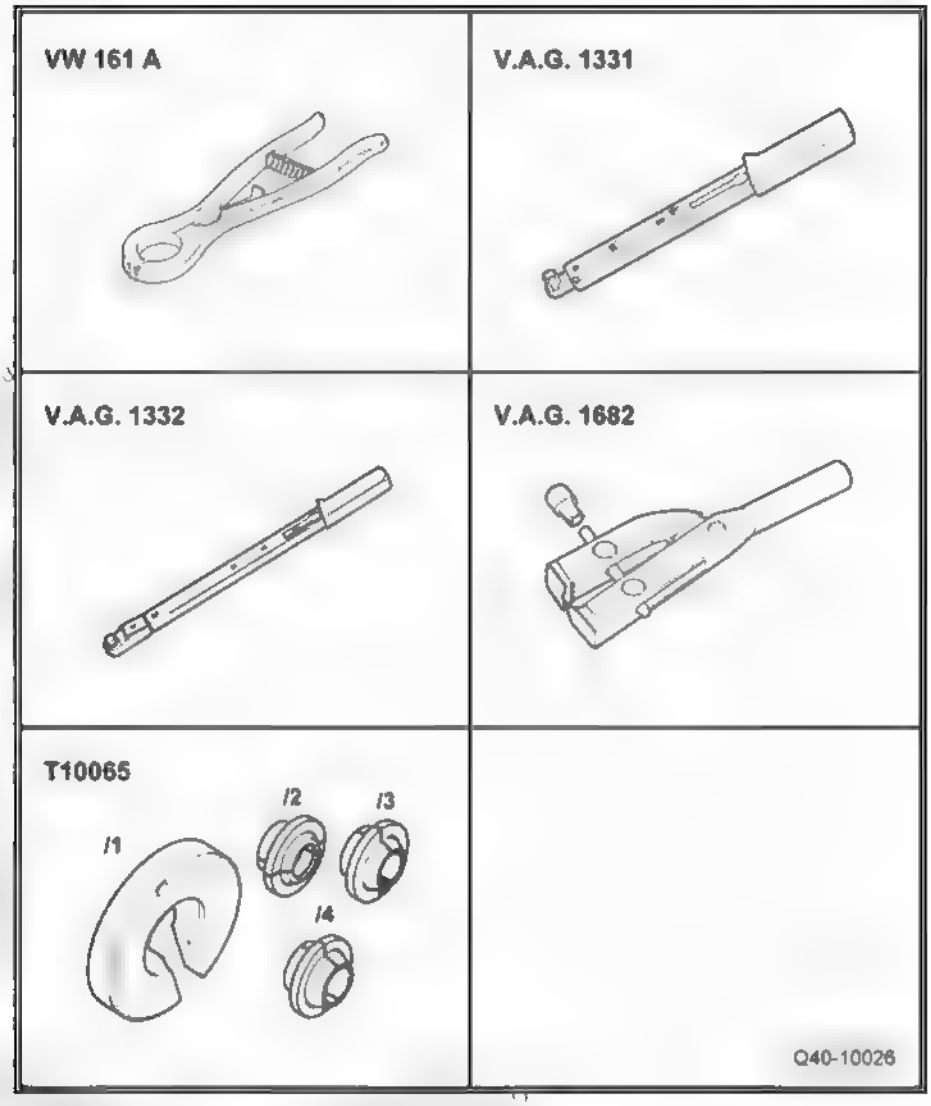
Special tools and workshop equipment required

- Pressure plate -VW 401-
- Pressure plate -VW 402-
- Pressure pin -VW 408 A-
- Pressure pin -VW 411-
- Pressure tube -VW 416 B-
- Thrust pad -VW 447 H-



Special tools and workshop equipment required

- Pliers or VW 5161A -VW 161A-
- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Clamp device -VAG 1682-
- Mounting device -T10065-



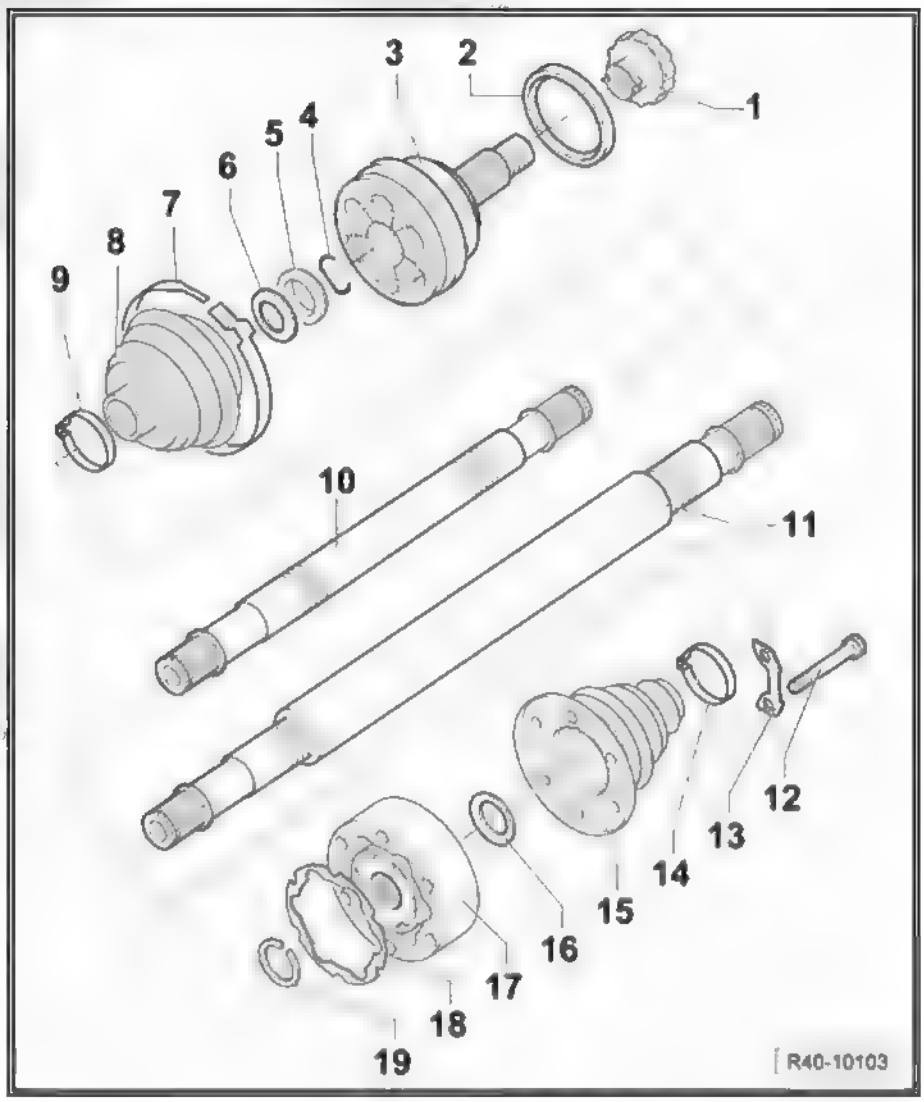
Grease quantity and types:

The constant-velocity joints are stored with Grease -G 000 603-. Refer to the ⇒ Chemical material manual .

	Grease	of total for	
Outer homokinetic articulation	Total quantity	Articulation	Protection covers
∅ mm	[g]	[g]	[g]
85	80	40	40

	Grease	of total for	
Inner homokinetic articulation	Total quantity	Articulation	Protection covers
∅ mm	[g]	[g]	[g]
90	80	40	40

Lubricate the joint with grease, if necessary, when replacing the protective cauls.



1 - Self-locking splined nut

for vehicles without ABS

- Refer to: ⇗ Electronic Parts Catalogue (ETKA)
- first tighten to 200 + 50Nm and loosen (going back) 180°, then tighten further to 50 Nm + 50°
- apply first White lubricating grease -G 052 751 A1- on the grooves and outer thread of the drive shaft, which must be previously cleaned. Refer to the ⇒ Chemical material manual
- replace after each removal

for vehicles with ABS

- tightening torque for 13" running gear (black nut) = 50 Nm

apply first Adhesive -D 185 400 A2- on the grooves and outer thread of the drive shaft, which must be previously cleaned. Refer to the ⇒ Chemical material manual

- tightening torque for 14" and 15" running gear (silver nut) = 50 Nm + 45°
- replace after each removal

2 - Deflector ring

3 - Outer homokinetic articulation

- full replacement only
- remove ⇒ page 61
- drive onto shaft on to stop with plastic hammer

4 - Lock ring

- replace after each removal
- install in the shaft groove

5 - Retainer

6 - Dished washer

- ∅ outer diameter (concave side) in contact with the retainer

7 - Clamp

- replace after each removal
- fasten ⇒ page 63

8 - Dust cover of the inner homokinetic articulation

- check for cracks and wear

9 - Clamp

- replace after each removal
- fasten ⇒ page 63

10 - Left drive shaft (solid shaft)

11 - Left drive shaft (solid shaft)

12 - Internally splined bolt
- ❑ tighten in cross pattern to 10 Nm
- ❑ 20Nm + 180°
- ❑ replace after each removal

13 - Thrust plate

14 - Clamp
- ❑ replace after each removal
- ❑ fasten ⇒ page 63

15 - Dust cover of the homokinetic articulation
- ❑ check for cracks and wear

16 - Dished washer
- ❑ ∅ grooved inner diameter
- ❑ Installing position: outer diameter (concave side) in contact with the articulation

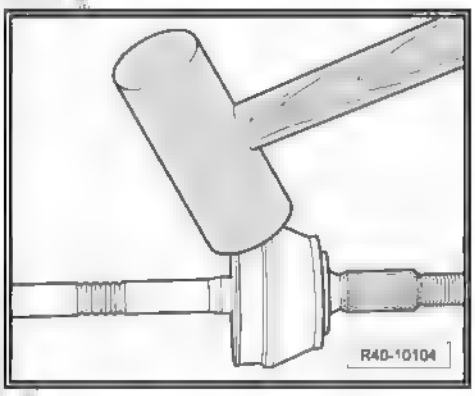
17 - Inner homokinetic articulation
- ❑ only replace complete
- ❑ remove ⇒ page 62
- ❑ install ⇒ page 62

18 - Gasket
- ❑ replace, removing the protective film, and paste to the joint.

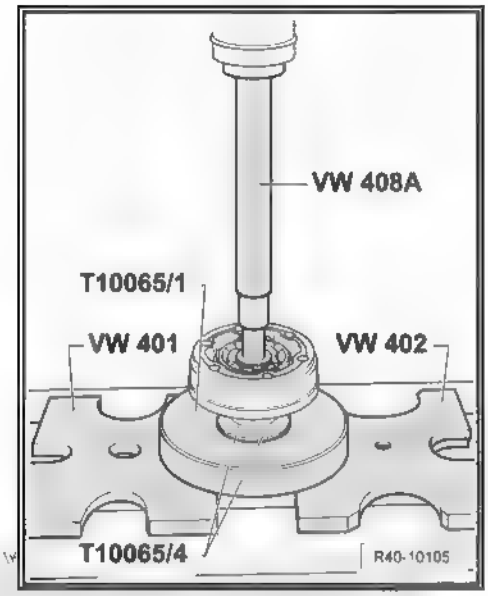
19 - Lock ring
- ❑ replace after each removal
- ❑ remove and install with the Pliers or VW 5161A -VW 161A-

Remove the external constant-velocity joint

– Remove from the drive shaft through vigorously pounding with an aluminum hammer.



Remove the internal constant-velocity joint

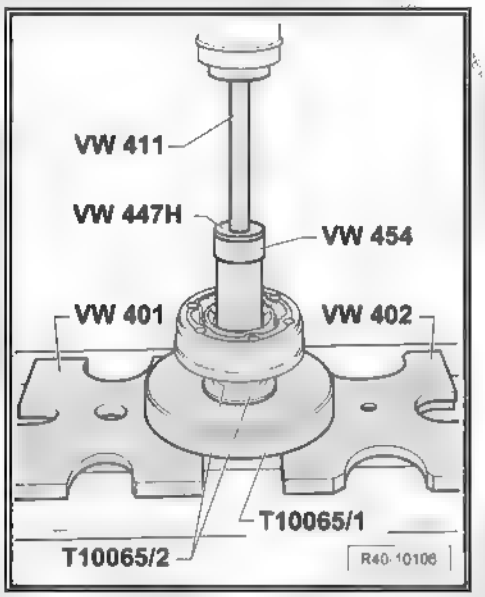


Note

First, remove the protective caul from the joint with the help of a drift.

Install the internal constant-velocity joint

- Press on the articulation to stopper.
- Insert the lock ring.

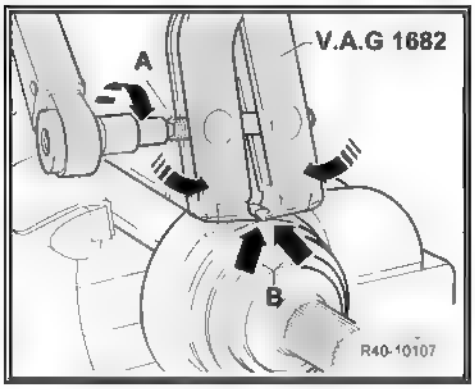


Note

The ball hub internal diameter chamfer (splined) must face the the drive shaft shoulder.

Install brace on outer joint

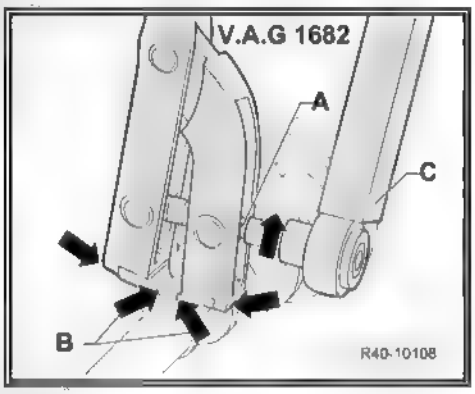
- Install the Clamp device -VAG 1682- as displayed in the illustration While doing it, make sure that the pliers claws fit the ends -arrow B- of clamp
- Tight the clamp by turning the bolt with a torque wrench (do not tilt the pliers)



Note

- *The hardness of the material from the constant-velocity joint protective caul (when compared with rubber) makes necessary to use a stainless steel clamp, and it can only be tightened with the help from the Clamp device -VAG 1682-*
- *Tightening torque: 25 Nm*
- *Use "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331- -C-*
- *Ensure the spindle -A- is not blocked. If needed, grease with Lubricating grease MoS2. Refer to the ⇒ Chemical material manual*
- *If the thread is tight e.g. dirty, the required tensioning force for the brace will not be achieved in spite of correct tightening torque settings*

Install the clamp on the inner articulation protection cover (smaller diameter)



42 – Rear suspension

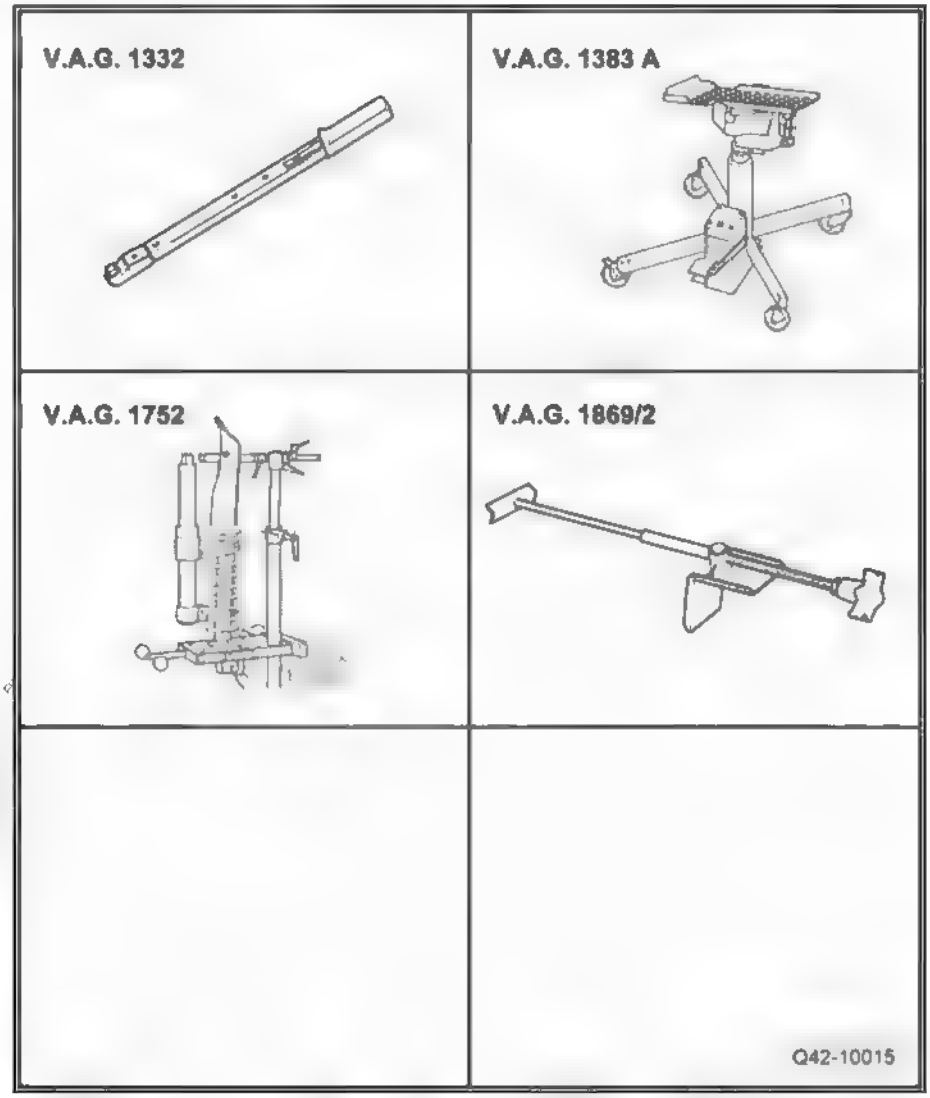
1 Rear axle - repair

> **WARNING**
>
> *Always replace self-locking nuts and screws which were subjected to angular torque.*

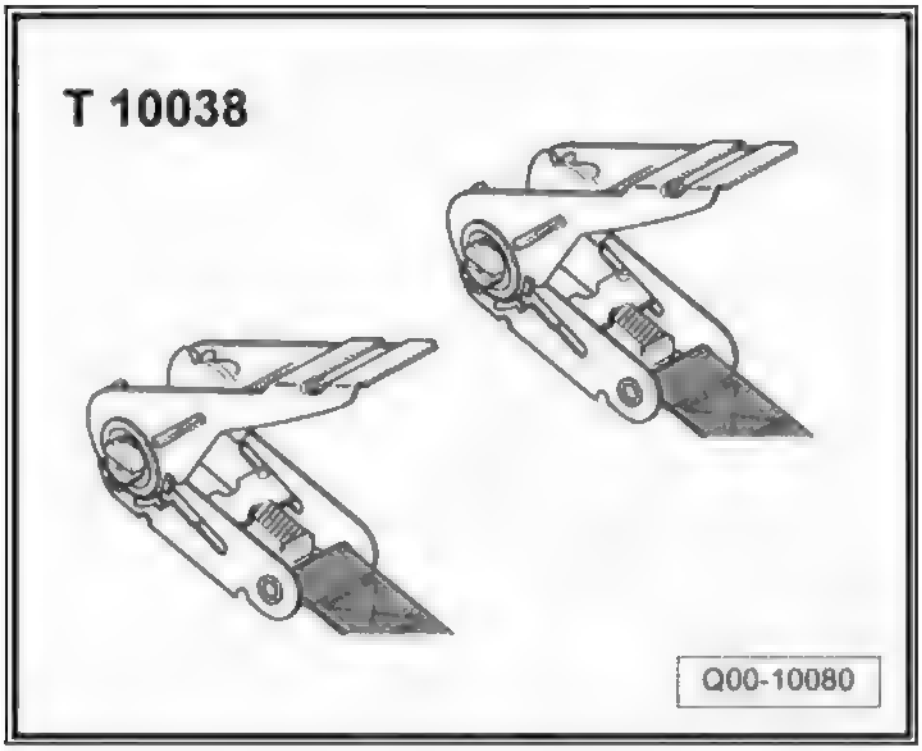
1.1 Rear axle - remove and install

Special tools and workshop equipment required

- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- and Tray for engine jack EQ 7081 -VAG 1359/2-
- Suspension pillar device - VAG 1752-
- Brake pedal compression device -VAG 1869/2-



♦ Tension belt -T 10038-



1.1.1 Removal

– Measure distance from wheel housing to wheel centre ⇒ page 6 .

– Remove the centre console ⇒ Body - internal mountings; Rep. Gr. 68 ; Internal equipment .

– Release the parking brake.

– Loosen adjusting nut -arrow- so that the handbrake cables can be removed from the equalizer.

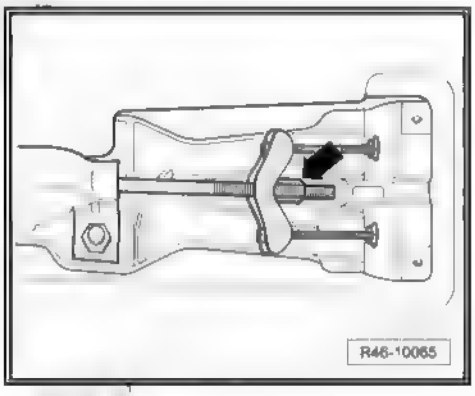
– Install the Brake pedal compression device -VAG 1869/2- .

This will prevent the brake fluid from draining from the brake pipes and the ABS hydraulic unit!

– Lift the vehicle to a suitable work height.

Fasten the vehicle to the lift

The vehicle must be fastened to the support arms of the lift before the rear axle is removed



Caution

If the vehicle is not fastened to the lift, the vehicle may slide off the lift.

– Remove the plugs from the longitudinal member -3- and pass the fastening belt through the holes.

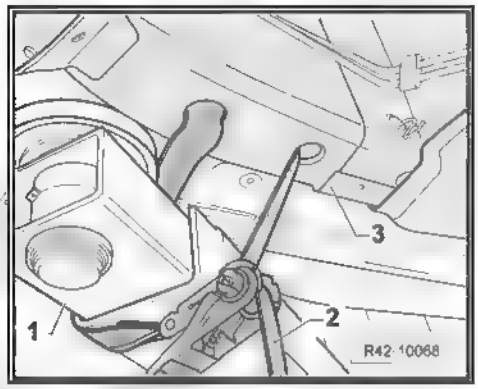
1 - Elevator arm

2 - Tension belt -T 10038-

– The vehicle must be fastened on the right and left sides with the help of the fastening belts.

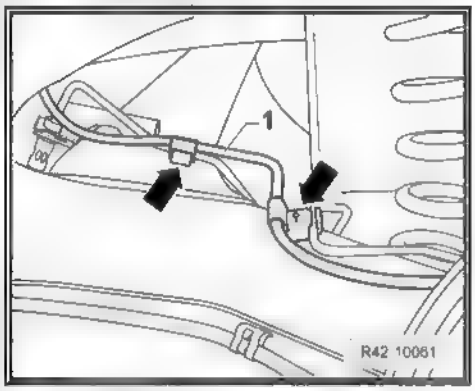
– Remove the wheels

– Disconnect the connector from the speed sensor.



– Remove the cable -1- from the speed sensor by removing it from the clips -arrows-.

– Lower rear muffler ⇒ Engine; Rep. Gr. 26 ; Exhaust system .



– Install spring tensioner -1-.

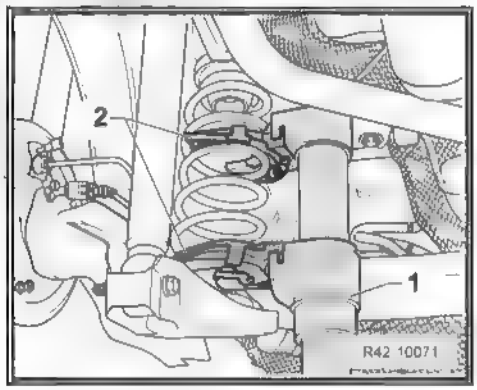
1 - Compression device or VW 5340 -VAG 1752/1-

2 - Spring support -VAG 1752/3-

– Tension the coil spring until it is possible to remove it.

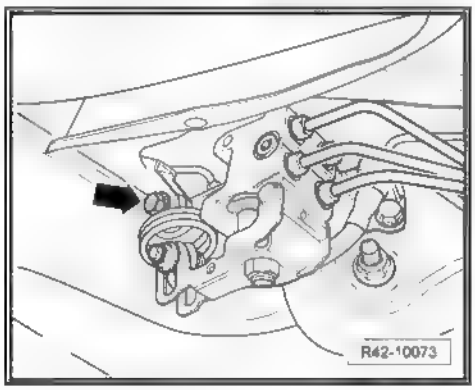
– Remove the spring.

Vehicles without ABS

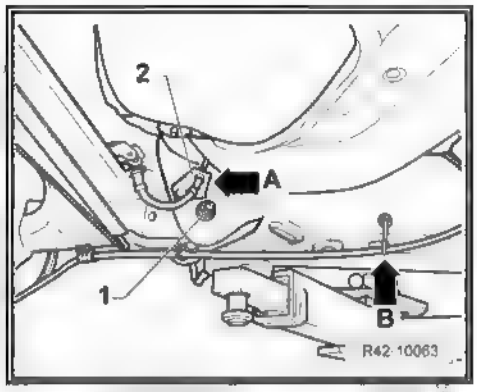


– Remove the screw -arrow-.

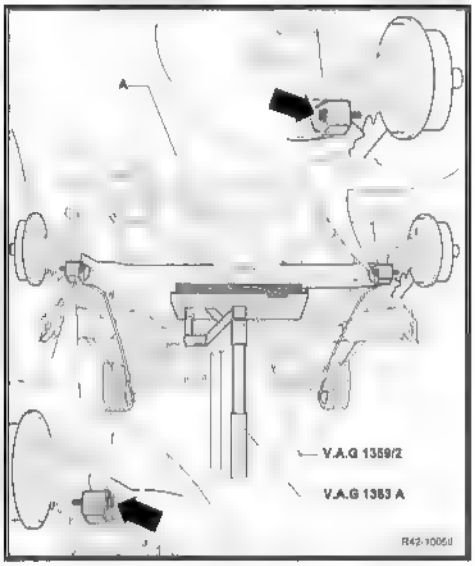
Continuation for all vehicles:



- Disconnect the brake pipes -arrow A- and remove the clip.
- Remove the left brake hose from the support -2-.
- Remove the right hose from rear axle beam
- Remove parking brake cables of supports -arrow B-
- Remove the guide tubes from the parking brake cables.
- Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- .
- Fasten the rear axle with the belt or a similar device when lowering and removing.
- Remove screws -1- from rear axle beam.



- Loose rear axle from shock absorbers -arrows-.
- Lower rear axle using Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- .



1.1.2 Installation

Before installing the rear axle, lubricate the metal-rubber bearings cavities with Assembly Grease -G 052 150 A2- . Refer to the ⇒ Chemical material manual . If the rear axle is installed without lubrication, there may be noises while driving the vehicle.

- Fasten the axle correctly and unladen ⇒ page 5 .

The rest of the installation is processed in the reverse order from removal.

- Bleed the brake system. Refer to the ⇒ Brake system; Rep. Gr. 47 ; Brakes - Hydraulic system, servo brake .
- Fit wheel and tighten screws ⇒ page 88 .

Tightening torque:

Rear axle to its support ⇒ Item 22 (page 69) .

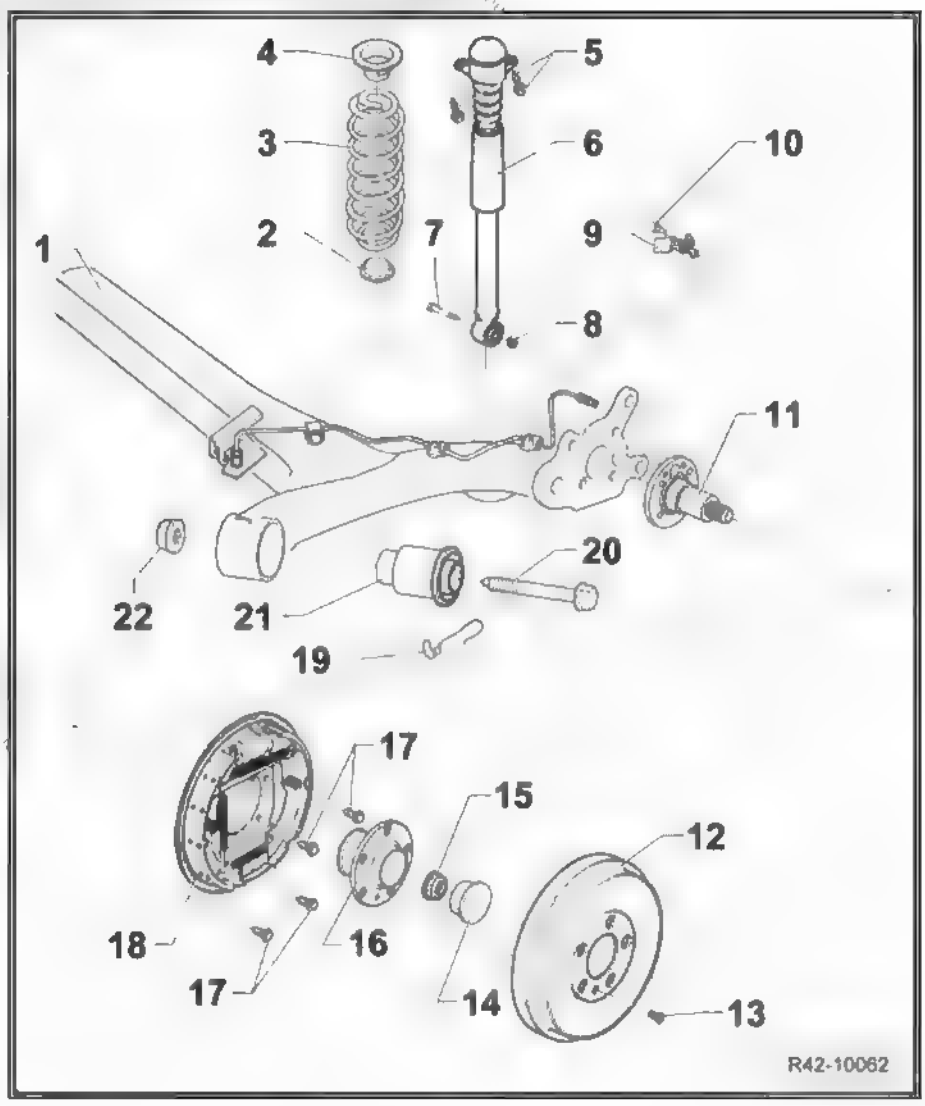
Shock absorber to rear axle ⇒ Item 8 (page 69) .

Braking pressure adjustment to rear axle. Refer to the ⇒ Brake system; Rep. Gr. 47 ; Brakes - Hydraulic system, servo brake .

1.2 Rear axle body for drum brakes - assembly overview

WARNING

- *At a same vehicle, only shock absorbers from the same brand must be used.*
- *Welding and straightening on the rear axle and stub axle is not allowed.*



1 - Axle beam
- ❑ the shaft tip contact surface and threaded holes must be free from paint and dirt

2 - Lower spring plate
- ❑ check the plates for damage

3 - Coil spring
- ❑ observe the color coding
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

Spring correspondence through the PR number

These numbers are indicated on the vehicle data plate
- ❑ Outer surface of the springs shall not be damaged

4 - Spring seat

5 - Hexagon screw
- ❑ 30 Nm + 90°
- ❑ replace after each removal

If the soldered nut thread in the longitudinal member is damaged, the thread can be repaired with a Heli-Coil thread insert

Servicing thread in longitudinal member

6 - Damper
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

WARNING

At a same vehicle, only shock absorbers from the same brand must be used.

7 - Hexagon screw
- ❑ replace after each removal

8 - Self-locking nut
- ❑ 40 Nm + 90°
- ❑ when tightening, check the installation angle of the rear axle in relation to the shock absorber ⇒ page 70
- ❑ replace after each removal

9 - ABS speed sensor
- ❑ before installing the sensor, you must clean the internal surface of the hole and apply Grease -G 000 650- . Refer to the ⇒ Chemical material manual

10 - Hexagon socket head screw
- ❑ 8 Nm

11 - Stub axle
- ❑ straightening operations are not permitted
- ❑ reworking the thread is not permitted

12 - Brake drum

13 - Screw
- ❑ 4 Nm

14 - Protection cover against dust
- ❑ replace after each removal
- ❑ remove and install ⇒ page 79

A perfect seal is only achieved by using a new dust protection cover

This is the only way to ensure optimal operation and high durability of the roller bearing

15 - Self-locking splined nut
- ❑ 70 Nm + 30°
- ❑ replace after each removal

16 - Wheel hub with wheel bearings
- ❑ the ABS sensor ring is installed in the wheel hub
- ❑ remove and install ⇒ page 79

The wheel roller bearing and the wheel hub are installed together in a housing

This wheel bearing/hub set is free of maintenance and adjustment. Adjustment and repair works are not possible.

17 - Hexagon screw
- ❑ 30 Nm + 90°
- ❑ replace after each removal
- ❑ with dished spring

18 - Rear brake plate with brake shoes
- ❑ repair Please refer to manual ⇒ Brake system; Rep Gr. 46 ; Brakes - Mechanical systems

19 - Parking brake cable bracket

20 - Screw
- ❑ install from outside
- ❑ replace after each removal

21 - Metal and rubber bearing
- ❑ remove and install ⇒ page 70

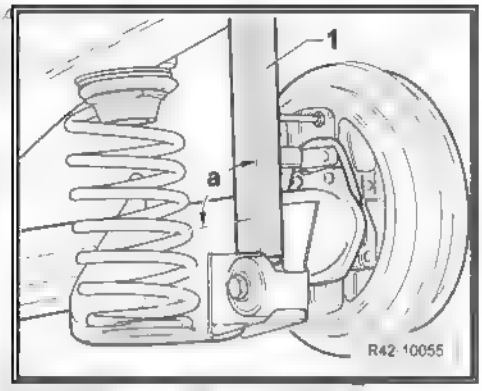
22 - Self-locking nut
- ❑ 45 Nm + 90°

- ❑ replace after each removal
- ❑ See notes ➔ page 67

Installation angle of the rear axle/shock absorber

1 - Damper

nd - approximately 95°

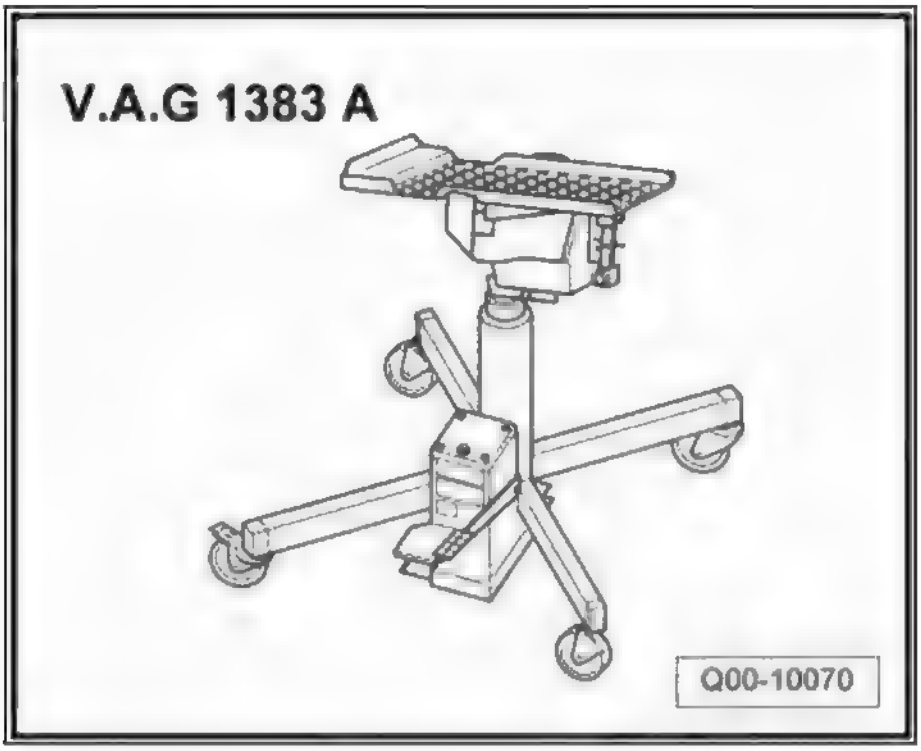


1.3 Metal and rubber bearing - remove and install

Special tools and workshop equipment required

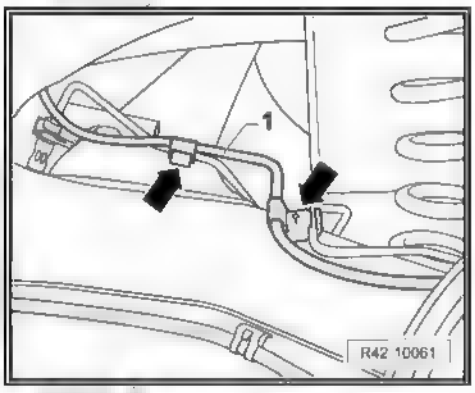
- Mounting device -3416/2-
- Brake pedal compression device -VAG 1869/2-
- "Torquemeter - 40 to 200Nm (socket 1/2")" -VAG 1332-
- Hydraulic press cylinder - VAS 6178-
- Hydraulic pump -VAS 6179-
- Mounting device -VAS 6180-

- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-



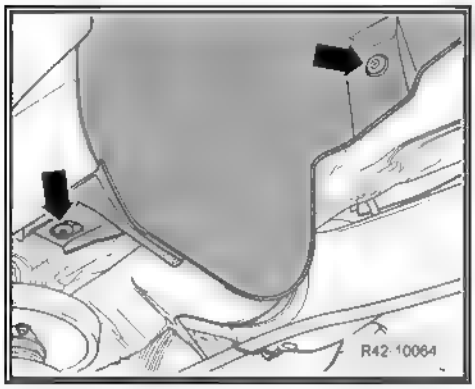
1.3.1 Removal

- Measure distance from wheel housing to wheel centre ⇒ page 6 .
- Release the parking brake.
- Install the Brake pedal compression device -VAG 1869/2- .
- Lift the vehicle to a suitable work height.
- Remove the wheels.
- Disconnect the connector from the speed sensor.
- Remove the cable -1- from the speed sensor by removing it from the clips -arrows-.



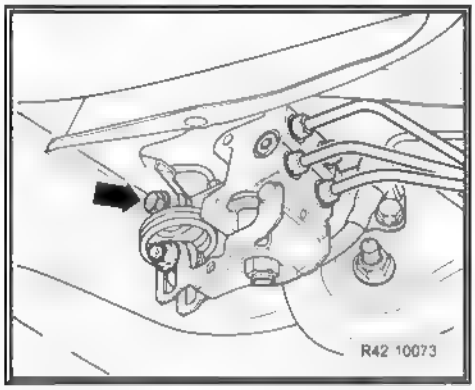
– Remove the bolts from the wheel housing liners -arrows- to both sides

Vehicles without ABS

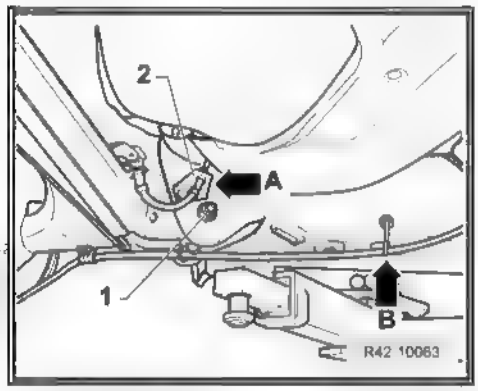


– Loosen the screw -arrow-.

Continued for all vehicles

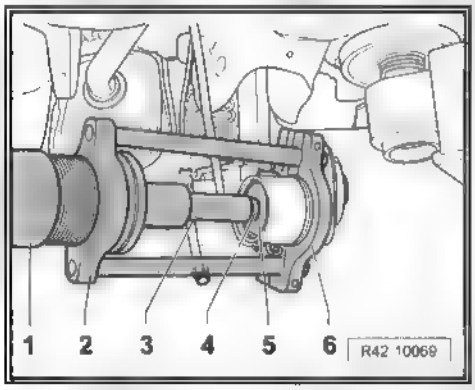


– Disconnect the brake pipes -arrow A- and remove the clip.
– Remove the left brake hose from the support -2-.
– Remove the right hose from rear axle beam.
– Remove parking brake cables of supports -arrow B-.
– Remove the handbrake cables from the guide tubes.
– Position the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- below.
– Remove the fastening screws/nuts from the rear axle body -1-.
– Lower the rear axle with the help of the Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- .



– Remove the metal and rubber bearing.

1 - Hydraulic pump -VAS 6179-
2 - Mounting device -VAS 6180/1-
3 - Mounting device -VAS 6180/4-
4 - Mounting device -VAS 6180/3-
5 - Mounting device -3416/2-
6 - Mounting device -VAS 6180/2-

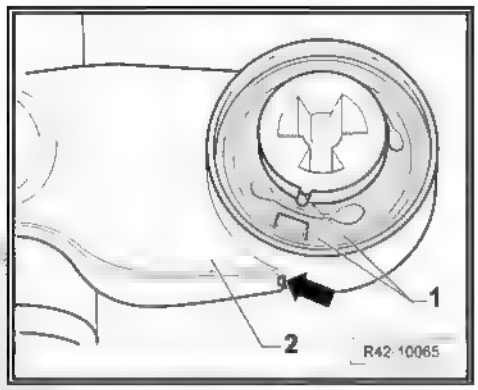


1.3.2 Installation

The metal and rubber bearing has marks -1- on frontal face

These marks must align with the edge -arrow- of supporting arm -2-

– Identify the position of such marks -1- on the bonded rubber bush cylindrical surface.



– Install the metal and rubber bearing and special tools onto the rear axle.

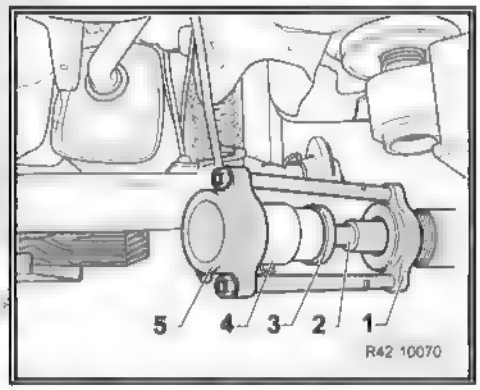
1 - Mounting device -VAS 6180/1-

2 - Mounting device -VAS 6180/6-

3 - Mounting device -VAS 6180/7-

4 - Metal and rubber bearing

5 - Mounting device -VAS 6180/8-

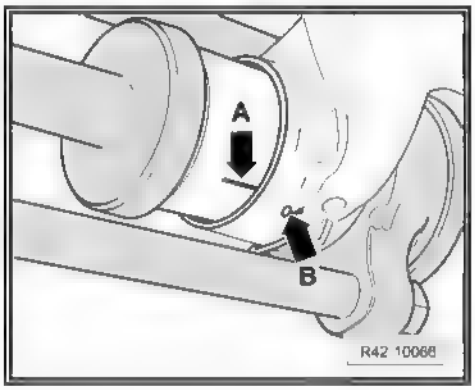


– Before fitting bonded rubber bush, assure marking -arrow A- is aligned with the supporting arm edge -arrow B-.

– Install the metal and rubber bearing.

– Check the position of the metal-rubber bearing after the installation.

– Lubricate the kidney-shaped cavities of the metal-rubber bearing with the Assembly Grease -G 052 150 A2- before installing the rear axle. Refer to the ⇒ Chemical material manual .



If the rear axle is installed without lubrication, there may be noises while driving the vehicle

– Fasten the axle correctly and unladen ⇒ page 5 .

The rest of the installation is processed in the reverse order from removal.

– Bleed the brake system. Please refer to manual ⇒ Brake system; Rep. Gr. 47 ; Brakes - Hydraulic system, servo brake .

Tightening torque:

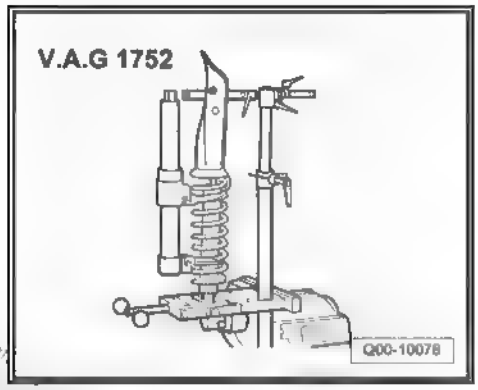
Rear axle to bearing bracket ⇒ Item 22 (page 69) .

Braking force adjustment to rear axle Please refer to manual ⇒ Brake system; Rep. Gr. 47 ; Brakes - Hydraulic system, servo brake .

1.4 Spring - remove and install

Special tools and workshop equipment required

♦ Suspension pillar device -VAG 1752-



1.4.1 Removal

– In order to remover the left spring, the rear muffler must be lowered. Please refer to manual ⇒ Engine; Rep. Gr. 26 ; Exhaust system .

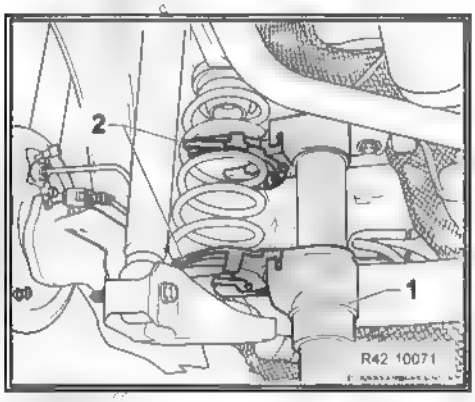
– Install the spring tensioning element -1-.

1 - Compression device or VW 5340 -VAG 1752/1-

2 - Spring support -VAG 1752/3-

– Tension the coil spring until it is possible to remove it.

– Remove the spring.



1.4.2 Installation

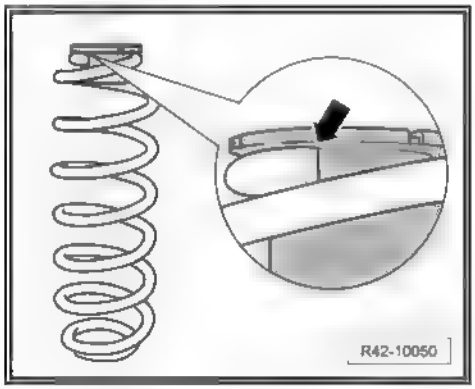
– Make sure that the lower spring plate is not damaged. If necessary, replace it.

– Install spring along with the spring plate.

– The end of the spiral must touch the upper stop -arrow-.

– Release the spring and remove the Compression device or VW 5340 -VAG 1752/1- (do not damage the superficial spring protection).

– After installing the left spring, the rear muffler must be fastened. In order to remover the left spring, the rear muffler must be lowered. Please refer to manual ⇒ Engine; Rep. Gr. 26 ; Exhaust system .



1.5 Shock absorbers - assembly overview

1 - Gas-filled shock absorbers
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

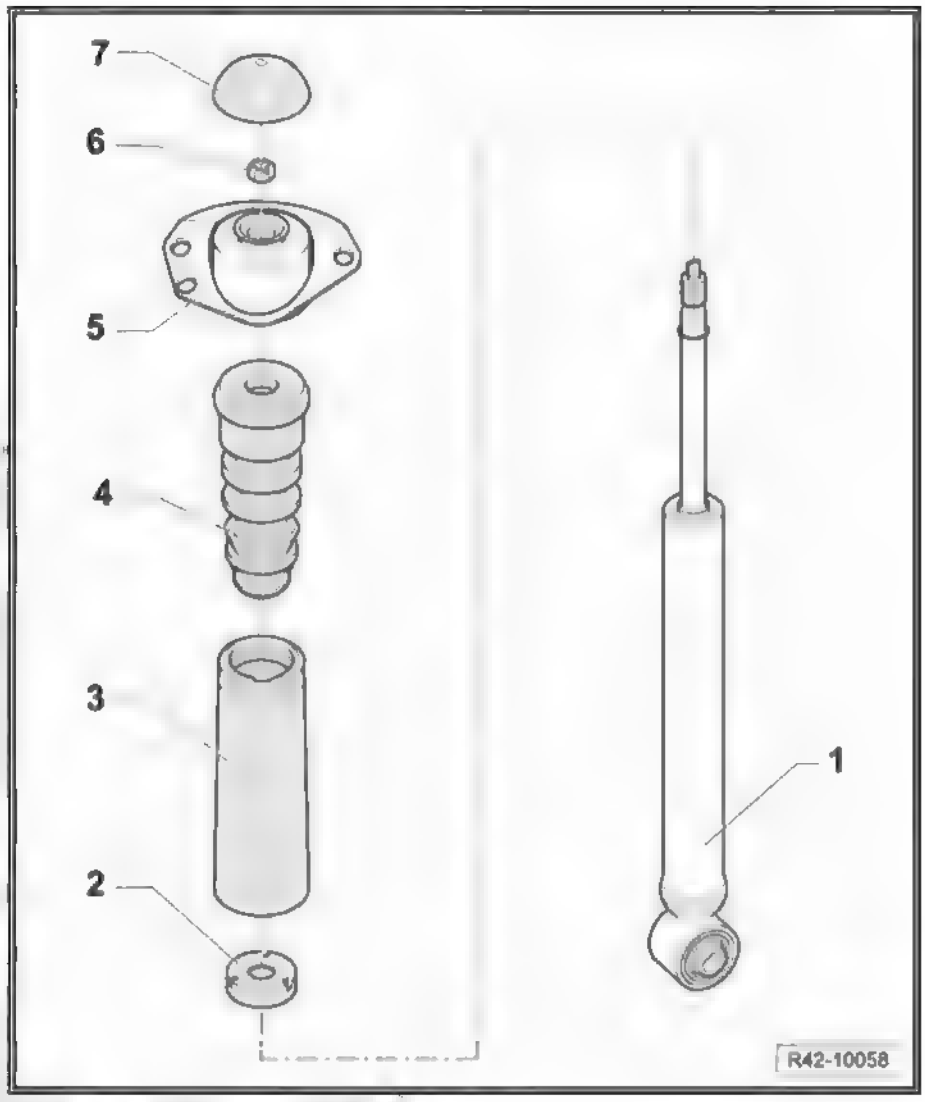
> **WARNING**
> *At a same vehicle, only shock absorbers from the same brand must be used.*

Check the operation

Compress the shock absorber manually. By doing this, the shock absorber rod must move throughout its length smoothly and with the same force.

When the shock absorber has sufficient pressure, the shock absorber rod will return to its initial position.

If the shock absorber rod does not return to its initial position and there is no oil leak, the shock absorber may still be ok.



2 - Protection cover

3 - Damper dust boot

4 - Stopper

5 - Shock absorber support

6 - Hexagon nut
- ❑ Self-locking
- ❑ 25 Nm
- ❑ replace after each removal
- ❑ remove ⇒ page 76

7 - Cover

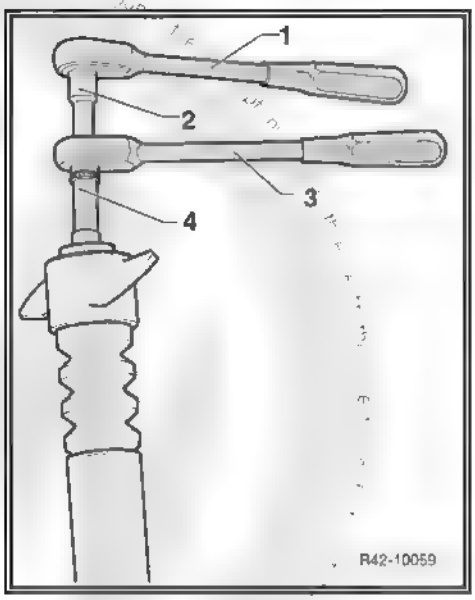
Remove the hexagonal nut from the shock absorber

1 - Commercially available ratchet

2 - Keys -T 10001/9-

3 - Keys -T10001/11-

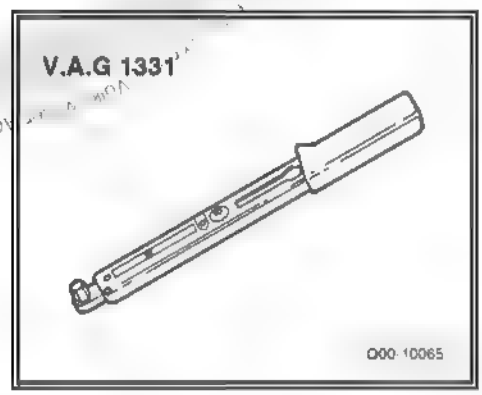
4 - Keys -T10001/1-



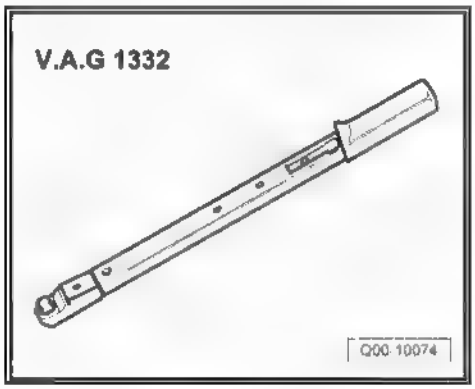
1.6 Damper - remove and install

Special tools and workshop equipment required

♦ "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-



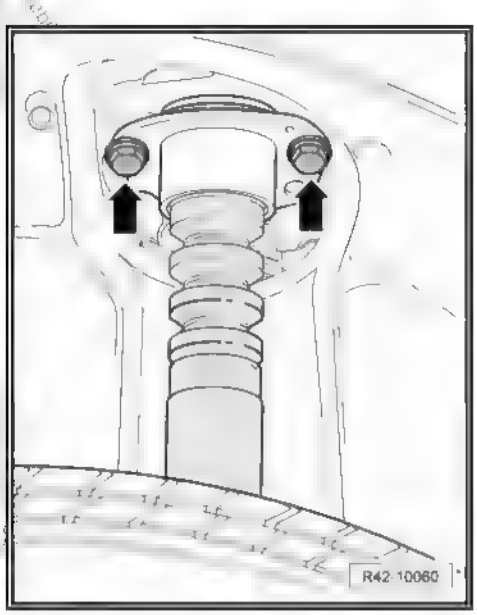
♦ "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-



1.6.1 Removal

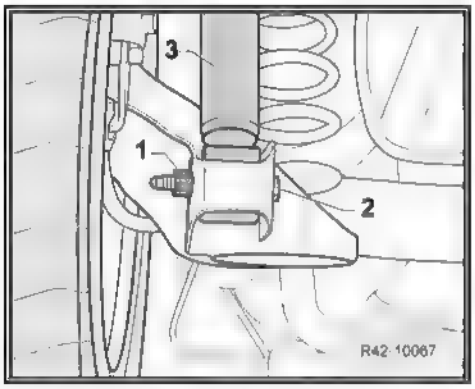
– Remove the screws. Remove screws -1-

– Lift the vehicle to a suitable work height.



– Loosen nut -1- and the hexagon screw -2- of shock absorber -3- of rear axle.

– Remove the shock absorber.



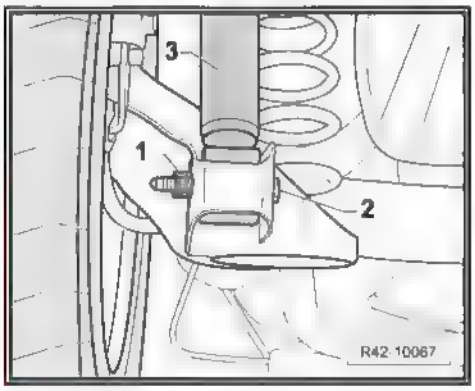
1.6.2 Installation

– Installing the damper.

– Fix shock absorber -3- with a new hexagon screw -2- and the new nut -1- on rear axle ⇒ Item 8 (page 69) .

– Fasten the shock absorber to the body ⇒ Item 5 (page 68) .

Installation position ⇒ page 70

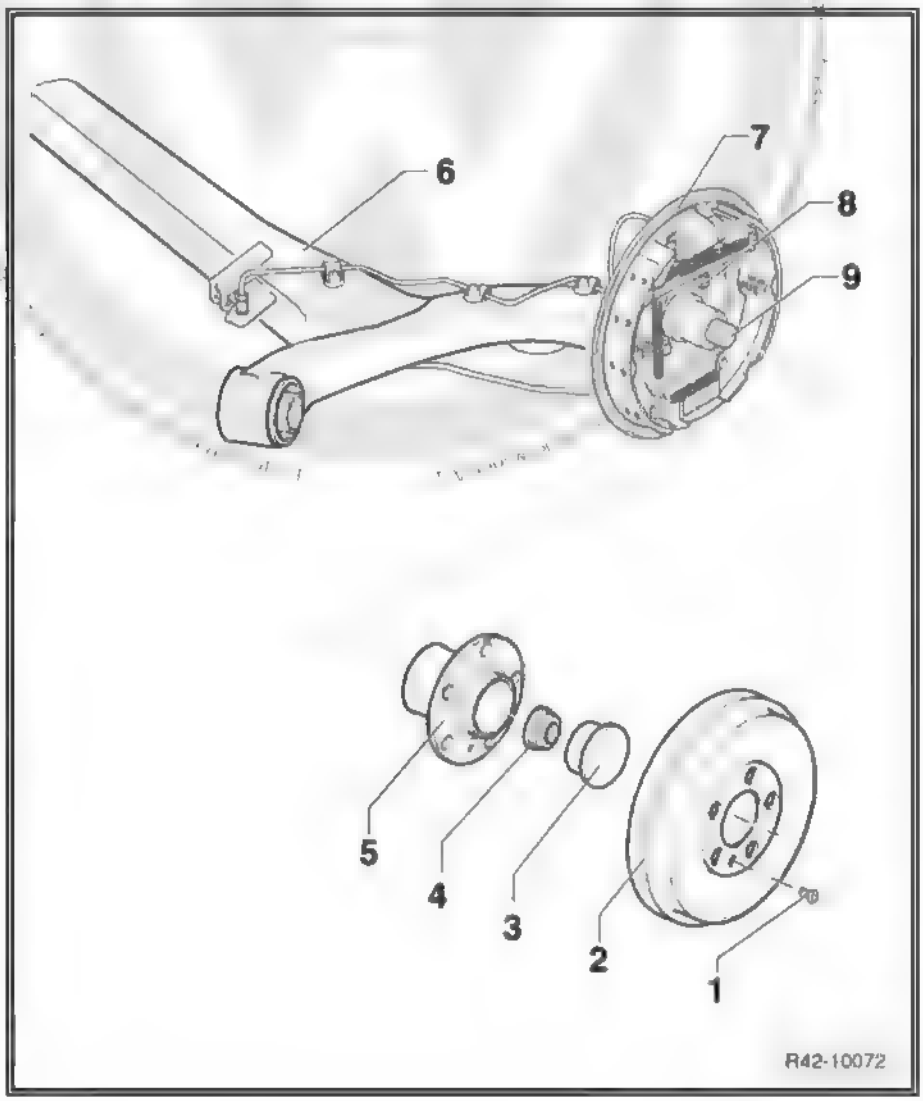


2 Wheel bearings for drum brakes (without adjustment)

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

2.1 Wheel bearings - assembly overview



1 - Crosshead screw
- 4 Nm

2 - Brake drum

3 - Dust protection cover
- replace after each removal
- remove and install ⇒ page 79

A perfect seal is only achieved when using a new protection cover against dust.

This is the only way to ensure optimal operation and high durability of the roller bearing

4 - Rifled nut
- self-locking
- 70 Nm + 30°
- replace after each removal

5 - Wheel hub with wheel bearings
- the ABS sensor ring is installed in the wheel hub
- remove and install ⇒ page 79

The wheel roller bearing and the wheel hub are installed together in a housing

This wheel bearing/hub set is free of maintenance and adjustment. Adjustment and repair works are not possible!

6 - Axle beam

7 - Rear brake plate with brake shoes
- repair. Please refer to manual ➢ Brake system; Rep. Gr 46 ; Brakes - mechanical systems

8 - Hexagon screw
- 30 Nm + 90°
- replace after each removal

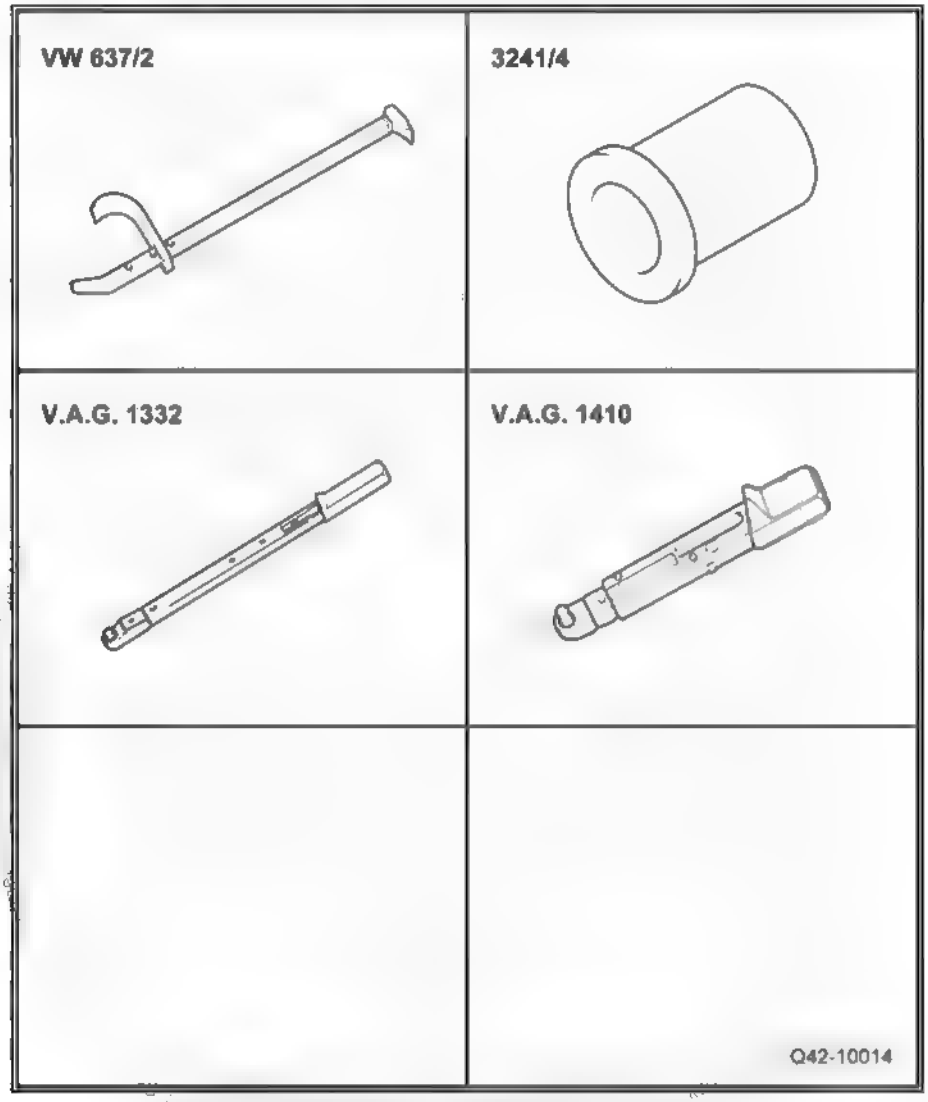
9 - Stub axle

- ❑ straightening operations are not permitted
- ❑ reworking the thread is not permitted

2.2 Wheel roller bearing/wheel hub set in vehicles with brake drums - remove and install

Special tools and workshop equipment required

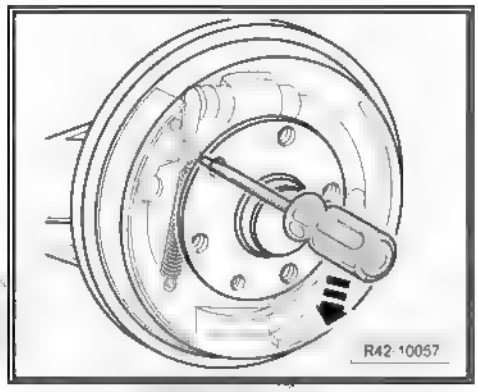
- ♦ Extractor for hub nut protectors -VW 637/2-
- ♦ Fitting sleeve -3241/4-
- ♦ "Torquemeter - 40 to 200Nm (socket 1/2")" -VAG 1332-
- ♦ Torque wrench - 4 to 20Nm (socket 3/8") -VAG 1410-



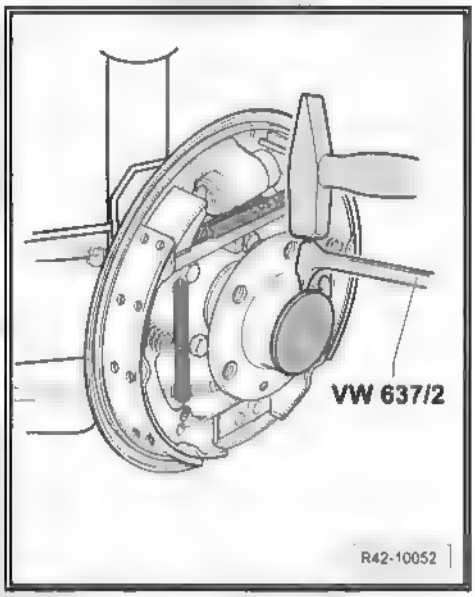
2.2.1 Removal

- Lift the vehicle
- Remove the wheel

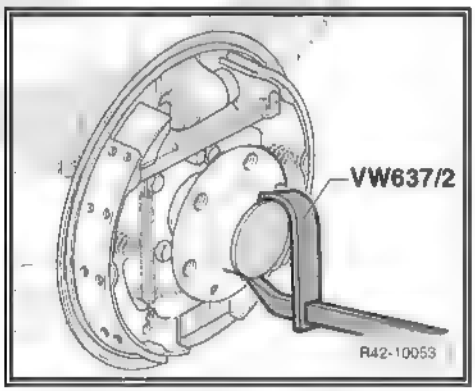
– Put the brake away.
– Insert a screwdriver through the brake drum hole and press the wedge upwards.
– Remove the brake drum screw and remove the brake drum.



Remove the dust protection cover from its housing by tapping lightly on the drift claw with the Extractor for hub nut protectors - VW 637/2- .



– Remove the protection cover.
– Remove the splined nut.
– Remove the wheel hub/bearing set from the stub axle.



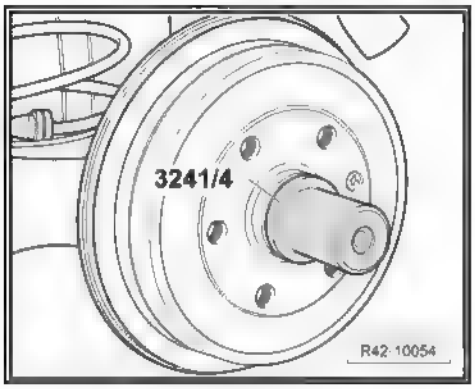
2.2.2 Installation

– Carefully install the wheel hub/bearing set on the stub axle.

Make sure that the wheel hub/bearing set is not tilted.

– Use a new splined nut and tighten it ➢ Item 4 (page 78) .

– Install the dust protection cover with the Fitting sleeve -3241/4- .



Note

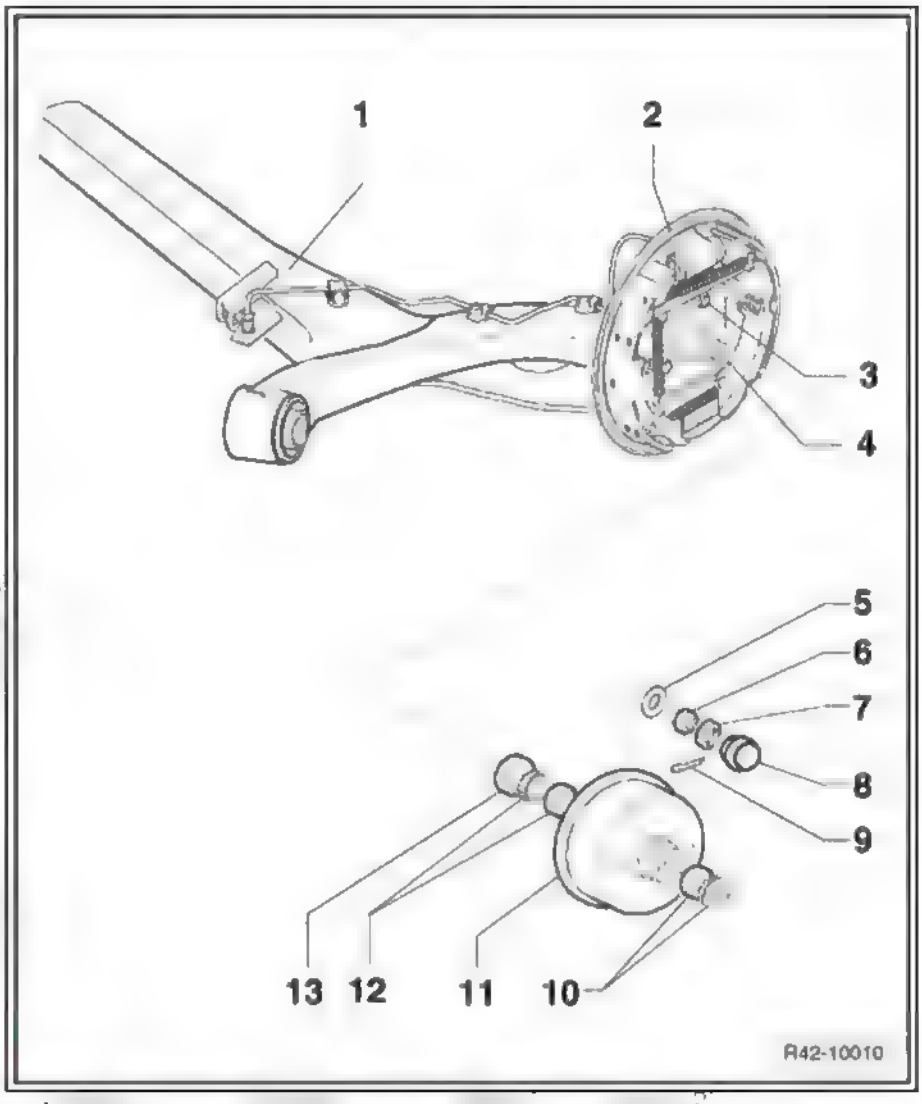
- *Always replace the dust protection covers*
- *Damaged dust protection covers allow humidity to enter, therefore always use the indicated tool.*

– Fit wheel and tighten screws ⇒ page 88 .

3 Wheel bearings for drum brakes (with adjustment)

> **WARNING**
>
> *Always replace self-locking nuts and screws which were subjected to angular torque.*

3.1 Wheel bearings - assembly overview



1 - Axle beam

2 - Rear brake plate with brake shoes
- ❑ repair. Please refer to manual ⇒ Brake system; Rep. Gr. 46 ; Brakes - Mechanical systems

3 - Hexagon screw
- ❑ 30 Nm + 90°
- ❑ replace after each removal

4 - Stub axle
- ❑ straightening operations are not permitted
- ❑ reworking the thread is not permitted

5 - Thrust washer

6 - Nut

7 - Locking cover

8 - Wheel hub cover
- ❑ At each removal, replace it

9 - Cotter pin

10 - Rear wheel external roller bearing
- ❑ Adjust ⇒ page 82
- ❑ Remove and install ⇒ page 84

11 - Brake drum

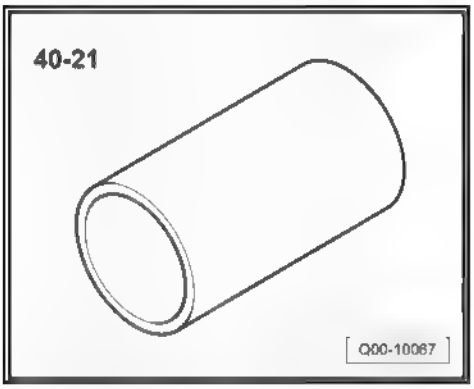
12 - Rear wheel internal roller bearing
- ❑ Adjust ⇒ page 82
- ❑ Remove and install ⇒ page 84

13 - Rear wheel internal roller bearing sealant
- ❑ Remove and install ⇒ page 86

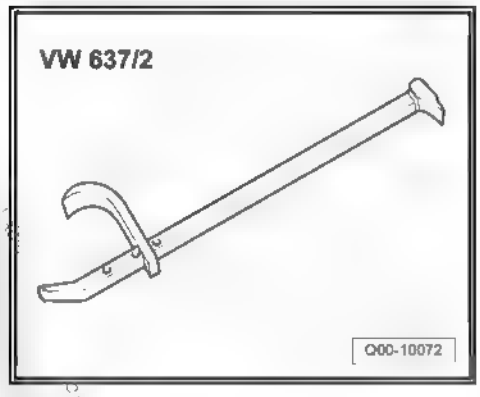
3.2 Wheel roller bearing - check and adjust

Special tools and workshop equipment required

- Support tube -40-21-



- Extractor for hub nut protectors -VW 637/2-



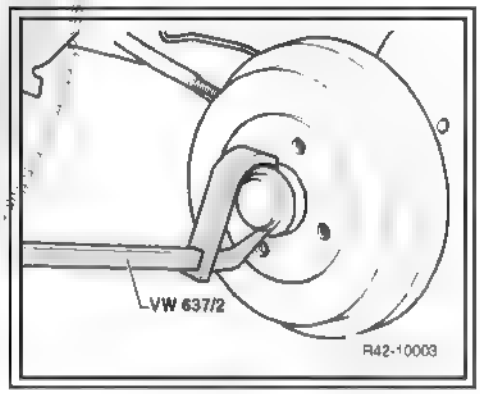
Check bearing clearance

- Remove the wheel.
- Remove the wheel hub protector, with the Extractor for hub nut protectors -VW 637/2- .

The clearance adjustment will be correct when it is possible to move the thrust washer only in the radial direction, and when moving the brake's drum in the axial direction, it does not have an apparent clearance.

Caution

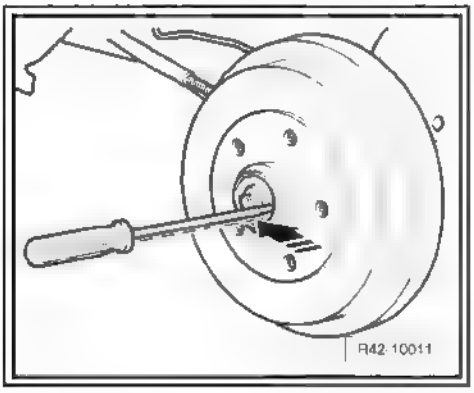
The washer must present a radial movement exactly in accordance with the following procedure.



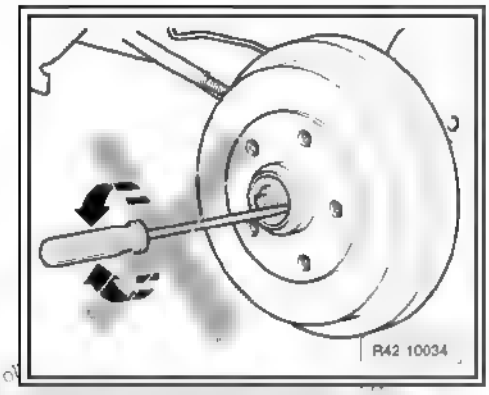
Procedure for checking bearing clearance adjustment.

1. Place a screwdriver between the washer and the brake drum hub, so that the screwdriver is perpendicular to the washer.

1. Move the washer in the radial direction with a light pressure of the forefinger-arrow- applied to the end of the screwdriver



1. Never turn -arrows- or leverage the screwdriver
2. If the washer does not move it is necessary to adjust the roller bearing clearance ⇒ page 84 .



WARNING

The screwdriver should touch only the washer and never the external wheel roller bearing.

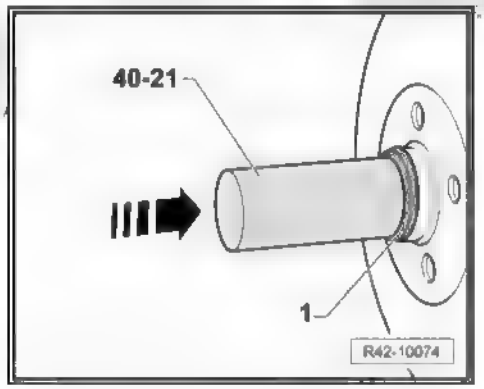
Never turn or leverage the screwdriver, thus ensuring that the screwdriver does not touch the brake drum hub under no circumstances.

If the notes above are not strictly followed, the adjustment of the roller bearing clearance will be jeopardized (it can lead to noises and breakage of roller bearings).

Adjust the roller bearing play

.

- Unlock and remove the locknut and the lock washer.
- Loosen or tighten the nut, relieving or increasing the pressure on the thrust washer; simultaneously, check its movement in the radial direction, according to the procedure described above ⇒ page 83 .
- Install the new lock washer and the locknut; tighten it to 70 Nm.
- Check the roller bearing clearance adjustment again. If necessary, repeat the procedure until the adjustment is correct ⇒ page 84 .
- The clearance adjustment will be correct when it is possible to move the thrust washer only in the radial direction, and when moving the brake's drum in the axial direction, it does not have an apparent clearance.
- Lock the nut and the locknut.
- Install wheel hub lid -1-with the Support tube -40-21-
- Fit wheel and tighten screws ⇒ page 88 .



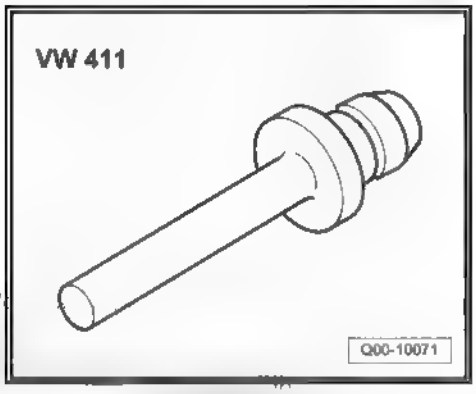
Note

The wheel hub cover must be replaced with every removal.

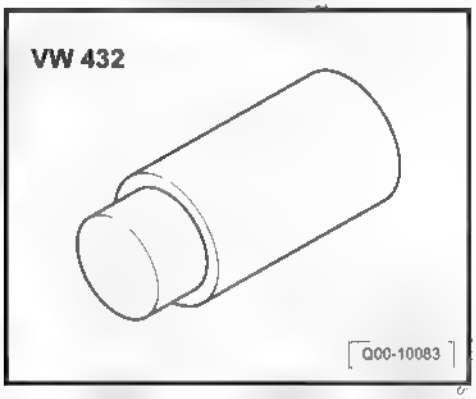
3.3 Internal/external rear wheel roller bearing - remove and install

Special tools and workshop equipment required

- Pressure pin -VW 411-



- Thrust pad -VW 432-

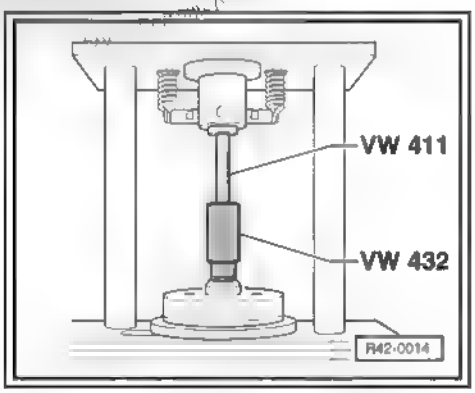


3.3.1 Removal

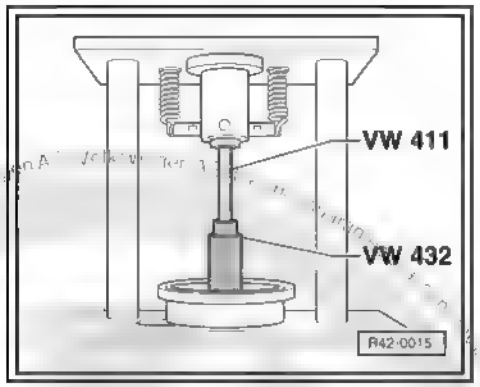
- Remove the wheel.
- Remove the brake drum.
- Remove the roller bearing sealant.
- Remove the internal and external roller bearing external tracks with a hammer and a drift pin.

3.3.2 Installation

- Install the external track of the external roller bearing.



- Install the external track of the internal roller bearing.
- Fill with multipurpose grease the space between the internal track and the roller bearing rollers.
- Fill the wheel hub with multipurpose grease.
- Install the internal roller bearing roller spacer.
- Install a new sealant on the rear wheel.
- Install the brake drum.
- Install the external bearing roller spacer, stop washer and nut.
- Install the wheel.
- Adjust the roller bearing clearance ⇒ page 82 .



3.4 Rear wheel internal roller bearing sealant - remove and install

3.4.1 Removal

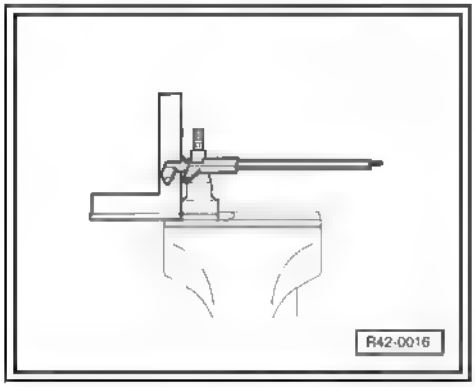
- Remove the wheel.
- Remove the wheel hub protection.
- Remove the cotter pin, sprocket and nut.
- Remove the brake drum, along with the thrust washer and the external roller bearing roller spacer.
- Remove the sealant from the internal wheel roller bearing with a screwdriver.

3.4.2 Installation

- Install a new sealant with a plastic or leather hammer.
- Install the drum, roller spacer, thrust washer and nut.
- Install the wheel.
- Tighten the wheel hub fastening nut to 30 Nm, turning the wheel during the tightening for perfect roller bearing seating.
- Adjust the roller bearing clearance ⇒ page 82 .

3.5 Stub axle - check

- Remove the axle stub ⇒ page 87 .
- Fasten the shaft tip to the vise using aluminum jaws.
- With the help of a square and a gauge, measure the axle end in three different points.



Note

If the difference of values exceeds 0.25 mm, replace the axle stub.

- Install the axle tip ➢ page 87

3.6 Axle end - remove and install,

3.6.1 Removal

- Remove the wheel with the brake drum.
- Remove the screws that fasten the the brake plate on the axle stub.
- Remove the axle stub.

3.6.2 Installation

- The installation is performed in the reverse sequence from the removal.
- Adjust the roller bearing clearance ⇒ page 82 .

44 – Wheels, tires, vehicle measurement

1 Wheel screws

1.1 Screws with anti-theft lock

Vehicles with aluminum wheels may be equipped with anti-theft wheel fastening screw.

The correct adapter socket is included in the vehicle tool kit, properly fitted in the spare wheel

The requests for adapter sockets must be made using the part number Screw with Anti-theft Adapter Socket -8D0 601 139 F- , followed by a 3-digit code.

To determine the 3-digit code, count the number of grooves in the screw safety standard and use the following table:

Number of grooves	3-digit code
10	000
11	001
13	002
14	003
15	004
16	005
17	006
19	007
20	008
21	009

Each adapter socket is shipped with one screw for the corresponding wheel.

Note

The Socket set -T 40004- is a full set of sockets for removing and installing the screws with this coding. It has the 10 combinations possible.

1.2 Wheel screws - tightening torques

Wheel hub wheel screw for all vehicles	120 Nm

2 Vehicle alignment

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

2.1 General aspects

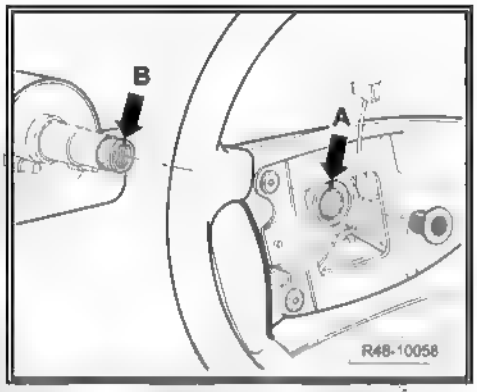
The vehicle must only be measured with an alignment equipment recommended by VW/AUDI.

We recommend measuring the front and rear axle geometry in each vehicle measurement.

Otherwise, the correct vehicle travelling behavior will not be ensured!

Note

- *It is recommended to align the vehicle after 1000 to 2000 km, because the coil spring seating process is concluded by then.*
- *When making the adjustment, the values must be as close as possible to the nominal specification.*



Pay attention! The steering wheel and steering column have a mark.

A - Mark on the steering wheel

B - Mark on the steering column

This is the only way to ensure that the rack will not be decentralized.

Vehicles with Electronic Stability Program "ESP".

- If the steering wheel is moved in these vehicles, it is necessary to check the basic adjustment of the Steering angle sensor - G85- ⇒ Perform the basic "adjustment on the Assisted Troubleshooting" with the Diagnosis, Measurement and Information System -VAS 5052A- .

Steering columns supplied as replacement parts do not present a punch point.

After the vehicle alignment and the subsequent test drive, these steering columns must be marked.

It is necessary to align the vehicle when:

- the travelling behavior is irregular
- involvement in an accident and the parts are replaced
- irregular tire wearing
- shaft parts replaced

Replaced front axle part	Required alignment		Replaced rear axle parts	Required alignment	
	Yes	No		Yes	No
Support arm	X		Damper		X
Wheel roller bearing housing	X		Coil spring		X
Track rod ball joint	X		Rear beam axle	X	
Steering box	X				

Replaced front axle part	Required alignment		Replaced rear axle parts	Required alignment	
	Yes	No		Yes	No
Subframe		X[3)]			
Suspension pillar		X			
Subframe console	X				
Stabilizer		X[3)]			

3) Prerequisite: If the subframe and console are positioned before disassembly ⇒ page 20

2.2 Checking conditions:

- Check the suspension, wheel roller bearings, steering wheel and connecting rods of the steering wheel for excessive play and damages
- The depth of the tire profile grooves cannot be more than 2 mm different in the same axle
- Tire filling pressure as prescribed
- Unladen vehicle
- The fuel tank must be full.
- Spare wheel and tools in the respective assembly position in the vehicle
- The water reservoir for the windshield/headlight washer system must be full.
- Make sure that the rotary plates and moving supports are not in the final stop (buffer) during the measurement.

Pay attention!

- The alignment machine must be properly assembled and adjusted to the vehicle; follow the equipment operation instructions manual.

If necessary, require a training by the manufacturer of the wheel alignment equipment.

The platform and the axle measurement machine/computer can, throughout time, deviate from the initial leveling/adjustment.

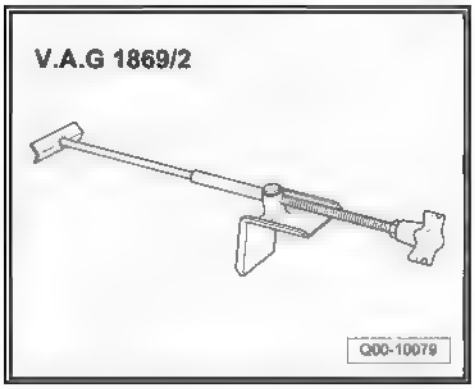
The platform and the axle measurement machine/computer must be gauged and, if necessary, adjusted at least once a year.

– Handle these highly sensitive units carefully and conscientiously!

2.3 Preparation for measurement

Special tools and workshop equipment required

♦ Brake pedal compression device -VAG 1869/2-



Axial vibration of the rim shall be compensated. Otherwise, an erroneous measurement result will be generated.

If the rim compensation is not performed, it will not be possible to perform a correct adjustment!

When you do this, follow the information from the alignment device manufacturer.

– Perform rim compensation.
– Install the Brake pedal compression device -VAG 1869/2- .
– Depress the brake pedal with the depressor.

2.4 Vehicle identification label

Explanation for PR numbers on the vehicle identification label

Different types of suspension are installed, depending on the engine and vehicle versions. These suspensions are identified by PR numbers.

The type of suspension installed on the front axle is identified on the vehicle identification label with its respective PR number.

Example of a vehicle identification label

In this example the vehicle is equipped with the standard G16 suspension -arrow-.

The vehicle identification label is located in the spare wheel compartment and in the Service and Guaranty booklet.

The PR numbers are decisive to make the correspondence between the nominal alignment vehicles and the vehicle.

2.5 Sequence for the alignment of the vehicle

The sequence of steps to follow should be observed:

1 - Check the front axle camber and adjust it if necessary ➢ page 93 . If the values are out of tolerance, the tilting to one of the vehicle sides must be checked and, if necessary, compensated before performing the adjustment ➢ page 93 .

2 - Check the rear axle camber ➢ page 94 . The camber is not adjustable. If the values are out of tolerance, the tilting to one of the vehicle sides must be checked and, if necessary, compensated ➢ page 93 . If the values still deviate

from the specification, the rear axle may be replaced, if necessary

3 - Check rear axle convergence ⇒ page 94 . The convergence in the rear axle is not adjustable If the values are out of tolerance, the tilting to one of the vehicle sides must be checked and, if necessary, compensated before performing the adjustment ⇒ page 93 If the values still deviate from the specification, the rear axle may be replaced, if necessary

4 - Check the front axle convergence and, if necessary, adjust it ⇒ page 95 . If the values are out of tolerance, the tilting to one of the vehicle sides must be checked and, if necessary, compensated before performing the adjustment ⇒ page 93 .

In general

If a value lies outside the tolerance, the transverse inclination of the vehicle must be checked first ⇒ page 93 .

2.6 Nominal values for vehicle alignment

Specifications valid for all engines ⇒ page 92 .

Specifications valid for all vehicle motorizations in ""0" position" of transverse inclination ⇒ page 92

2.6.1 Specifications valid for all engines

♦ Explanation on the PR numbers ⇒ page 91

Front axle	
Power steering	
PR Numbers	1N4
Convergence per total axle (without compression)	10′ ± 10′
Camber (in straight-line)	-15′ ± 30′
Maximum permissible difference between both sides (?Camber)	max. 30′
Alignment angle difference with steering 20° to the left and to the right	-1° 28′ ± 20′
Caster angle (not adjustable)	+4° 14′ ± 30′
Maximum permissible difference between the left side and the right side (Caster)	max. 30′

2.6.2 Specifications valid for all vehicle motorizations in ""0" position" of transverse inclination

♦ Explanation on the PR numbers ⇒ page 91 .

Rear axle	
PR Numbers	0N2
Camber	-1° 30′ ± 20′
Maximum permissible difference between both sides (Camber)	max. 30′
Total convergence (with specified camber)	+16′ ± 10′
Geometrical axle (maximum driving angular deviation)	max. 20′

2.7 Vehicles in ""0" position" of transverse inclination

If the alignment values are outside the permitted tolerances, the cause may be incorrect vehicle inclination

Vehicles with the steering wheel on the right side or, for example, vehicles with automatic transmission may be slightly inclined towards one side

This is due to the installation position of the assemblies and their associated weight transfer.

– Then, it is absolutely necessary to measure the distance -"nd" - from the left and right sides.

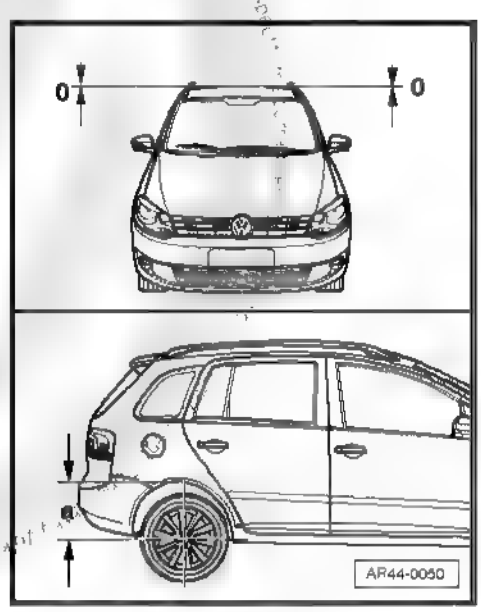
A -line 0- on the roof indicates the horizontal (zero) position of the vehicle.

– Correct the differences, if necessary.

On the front axle, compensate this difference by adding weights on top of the relevant suspension tower.

On the rear axle, compensate this difference by adding weights to the respective side of the boot.

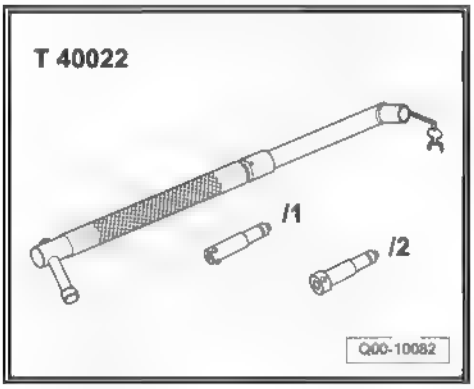
Sandbags approx. weight 10 kg are appropriate for that.



2.8 Camber on front axle - adjust

Special tools and workshop equipment required

- Adjustment tool -T 40022-

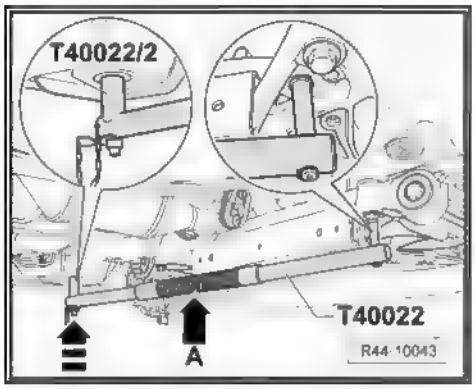


Note

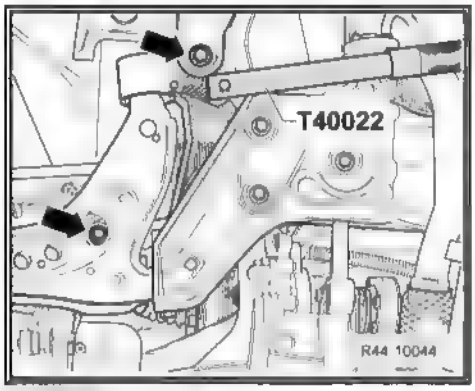
Move the subframe to the left or right, but never forward or backward!

– Remove the noise insulation.

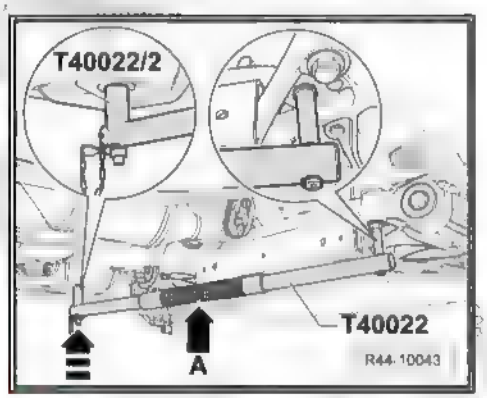
– Install the tool Adjustment tool -T 40022- with Adapter -T40022/2- on the floor and on the console and apply slight tension.



– Loosen the screws -arrows- that fasten the console and the subframe to the body on only one side.
– Specifications for camber can be adjusted by turning the cable -arrow A- ⇒ page 92 .
– If the value specified cannot be achieved, then loosen the screws that fasten the console and the subframe to the body on the other side and adjust again.
– When the value specified is achieved, install new screws on the subframe to body and tighten to the specified torque ⇒ Item 11 (page 8) .



– Then, release the cable -arrow A-.
– Position the Adapter -T40022/2- in the arrow direction and remove the adjustment tool.
– Tighten the screws that support the subframe to the body ⇒ Item 11 (page 8) .



If a value remains out of tolerance, the transverse inclination of the vehicle must be checked and compensated ⇒ page 93 , and repeat the adjustment procedure if needed.

2.9 Camber on rear axle - adjust

The camber cannot be adjusted

If a value lies outside the tolerance, the transverse inclination of the vehicle must be checked first ⇒ page 93

If the measured values lie outside the permitted tolerances, the axle body must be checked for damage and replaced when necessary.

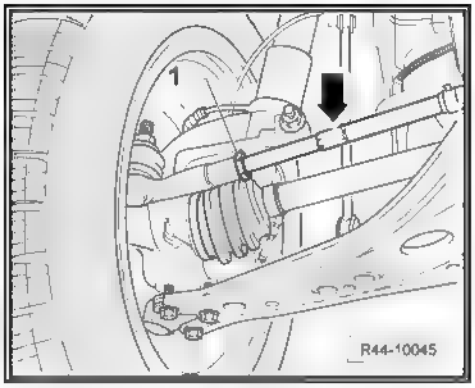
2.10 Convergence on rear axle - adjust

The convergence cannot be adjusted.

If a value lies outside the tolerance, the transverse inclination of the vehicle must be checked first ⇒ page 93 .

If the measured values lie outside the permitted tolerances, the axle body must be checked for damage and replaced when necessary.

2.11 Convergence on front axle - adjust



- Loosen lock nut -1-
- Adjust the convergence by turning the steering bar to the left and/or to the right.
- To do this, use a spanner on the hex head -arrow- of the steering bar

After turning the steering bars, confirm if the cauls are not twisted.

Twisted covers wear quickly

- Tighten lock nut -1-.

After tightening lock nut -1-, it is possible that the adjusted value slightly changes.

- Check the convergence value once more

If the convergence value measured lies within the tolerance, the adjustment is correct.

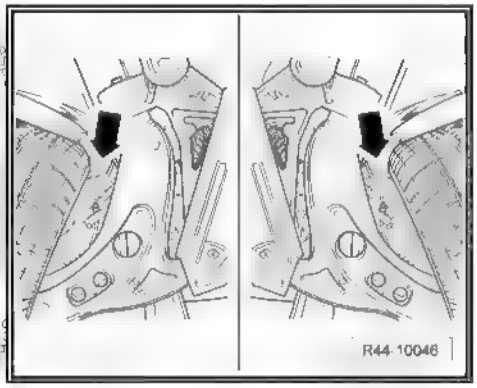
Tightening torque

Component	Tightening torque
Track rod lock nut	50 ± 5 Nm

2.12 Steering the wheel to the left and right - check

This check procedure is necessary if:

- the steering turns to the stop are different in more than 2°(degrees), from central steering wheel position
- there is contact between the tire and front axle or body parts when turning the steering wheel to its maximum position
- the left steering wheel turning diameter is different from that in the right side



The distances between the axle and tire wishbones -arrow- must be the same with maximum steering wheel turning.

If the distances are different, they can be corrected by turning steering linkage bars left or right.

For example:

If the right steering angle is smaller than the left one.

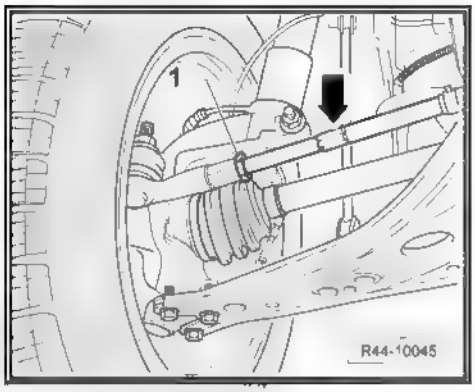
- Loosen the lock nuts of the steering track rod
- Turn the left steering wheel linkage bar counterclockwise (loosen from the steering bar joint).
- To achieve equal dimensions, turn the right steering bar in the opposite direction and in the same proportion (screw on the steering bar joint)
- Check full convergence.

Check if the total convergence is still according to the prescribed specifications after completing the adjustment!

After tightening lock nut-1-, it is possible that the adjusted value slightly changes

If the values do not deviate by more than 2' from the specified ones, the adjustment is correct

After turning track rods, ensure that the bellows are not twisted!



Tightening torque

Component	Tightening torque
Track rod lock nut	50 ± 5 Nm

48 – Steering

1 Steering wheel

Steering wheel with Ignition device for the driver's airbag -N95- .
Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 69 ; Occupants' protection .

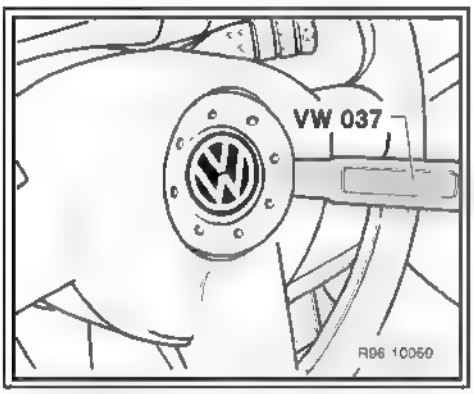
1.1 Horn activator -H- - remove and install

1.1.1 Removal

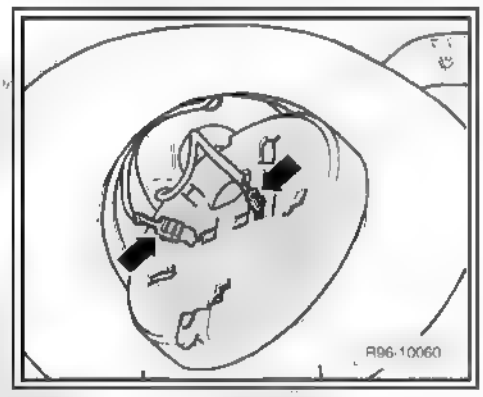
– Turn the ignition and all electric consumers off and remove the key from ignition.

Vehicles without Airbag:

– Carefully remove the Horn activator -H- with an Spatula -VW 037- .



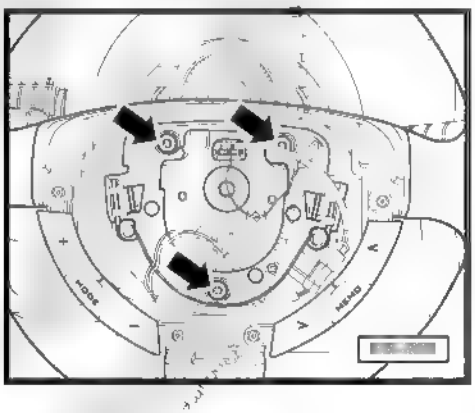
– Disconnect terminals -arrows-.
– Remove the Horn activator -H- .



Vehicles with Airbag:

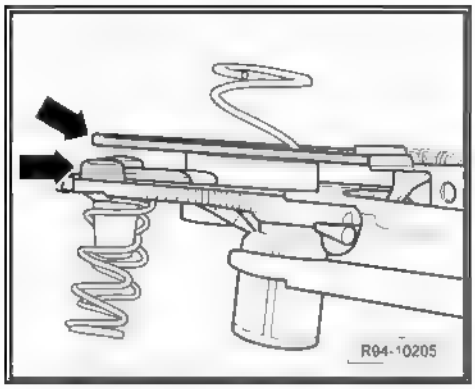
– Remove the Ignition device for the driver's airbag -N95- .
Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 69 ; Occupants' protection .

– Remove the attaching screws -arrows- in the contact support.
– Disconnect the connector and remove the contact support.



Note

Make sure the support contact surfaces, as well as the contact terminals on the steering wheel -arrows- are clean (with metal visible) before the installation.



1.1.2 Installation

Installation is carried out in the reverse order of removal.

1.2 Steering wheel and Horn activator -H- - assembly overview

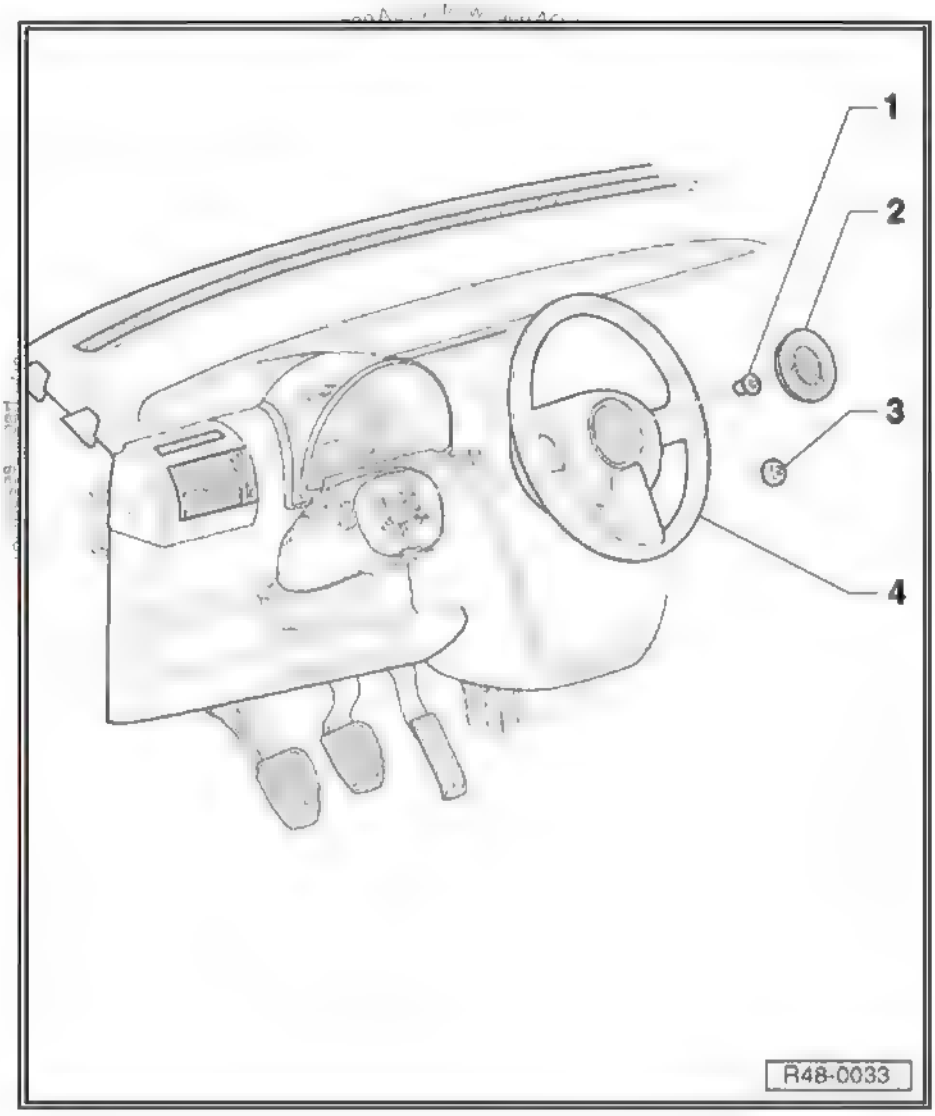
(up to the model 2010)

1 - Screw
- ❑ 30 Nm + 90°

2 - Horn activator -H-
- ❑ Remove and install ⇒ page 97

3 - Hexagon nut
- ❑ 50 Nm
- ❑ For fixed steering column.

4 - Steering wheel
- ❑ When assembling, the centering marks on the steering wheel and the steering column shall coincide ⇒ page 89
- ❑ Remove and install ⇒ page 101



(as from model-year 2011)

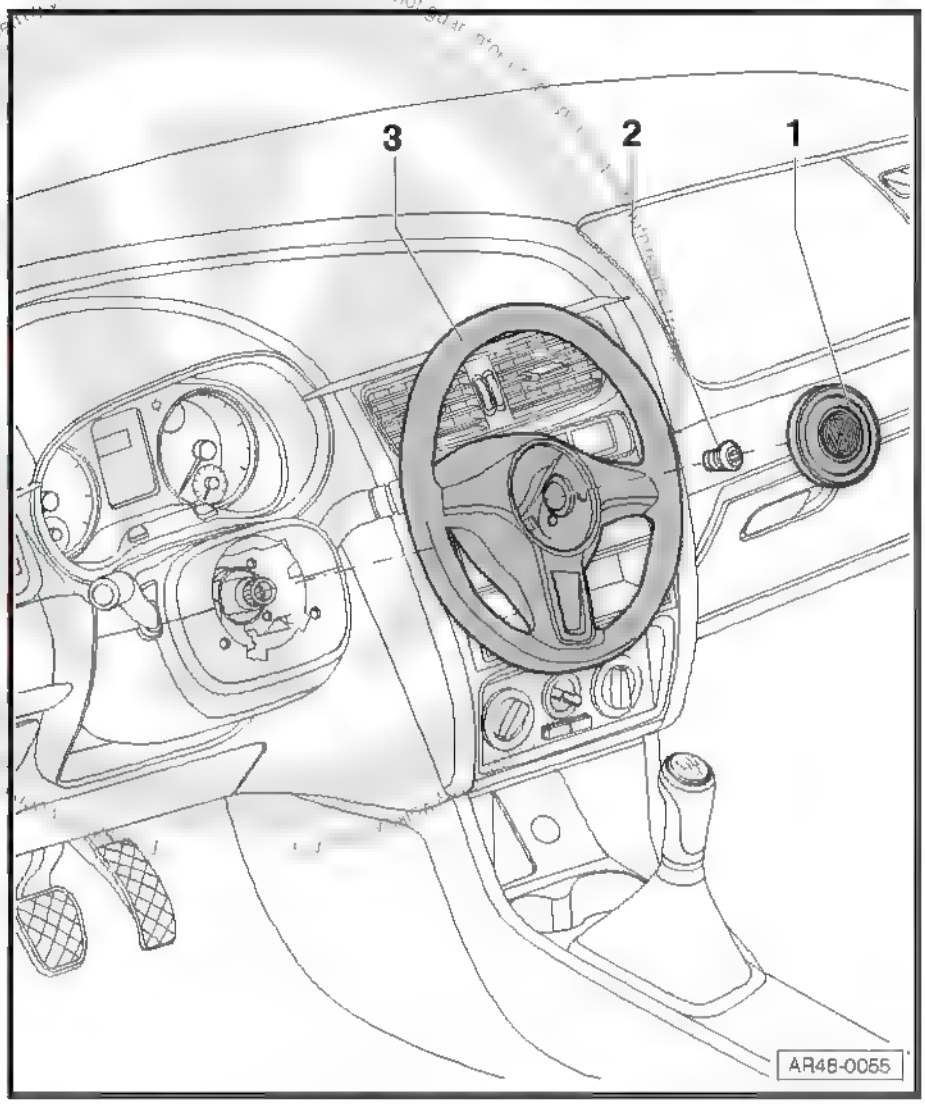
1 - Horn activator -H-

2 - Screw

- ❑ 30 Nm + 90°

3 - Steering wheel

- ❑ When assembling, the centering marks on the steering wheel and the steering column shall coincide ⇒ page 89
- ❑ Remove and install ⇒ page 101



(from the model 2011 onwards - vehicles with or without airbags)

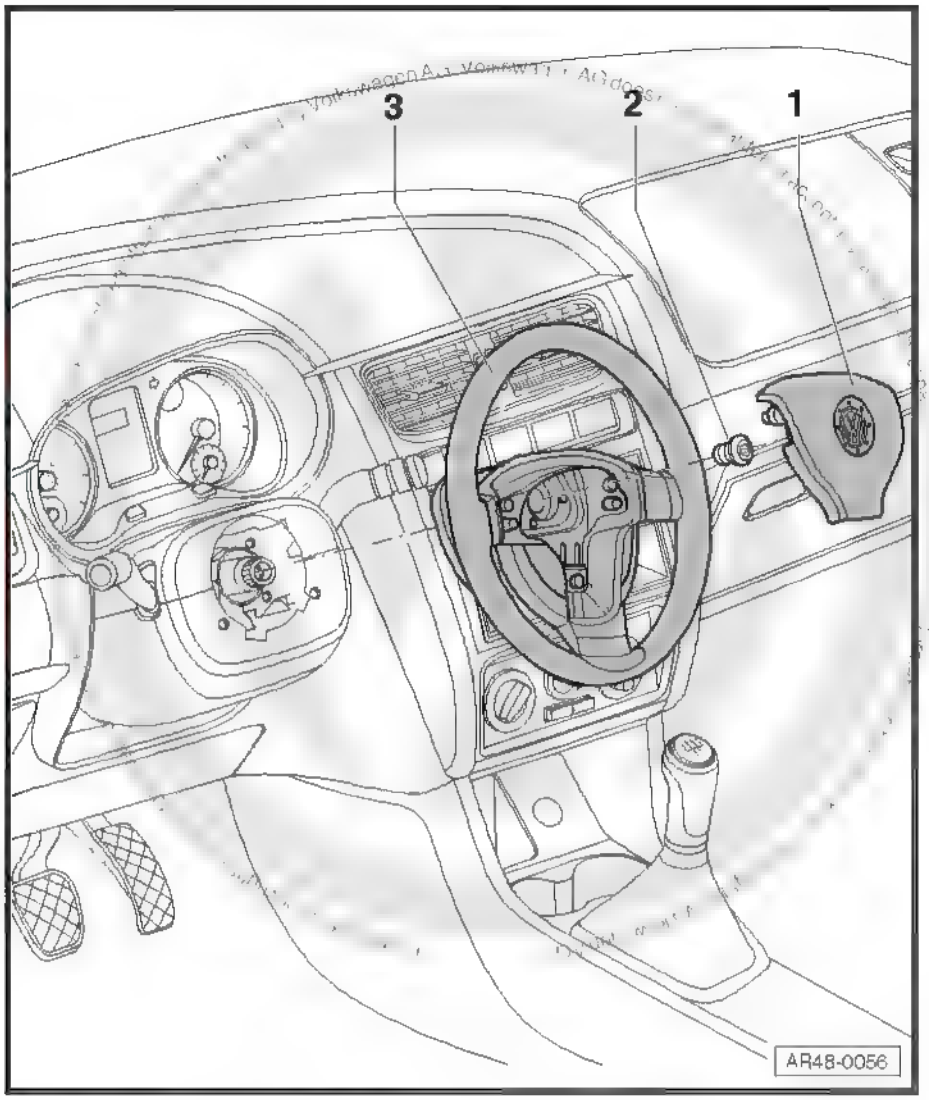
1 - Horn activator -H-

2 - Screw

- ❑ 30 Nm + 90°

3 - Steering wheel

- ❑ When assembling, the centering marks on the steering wheel and the steering column shall coincide ⇒ page 89
- ❑ Remove and install ⇒ page 101

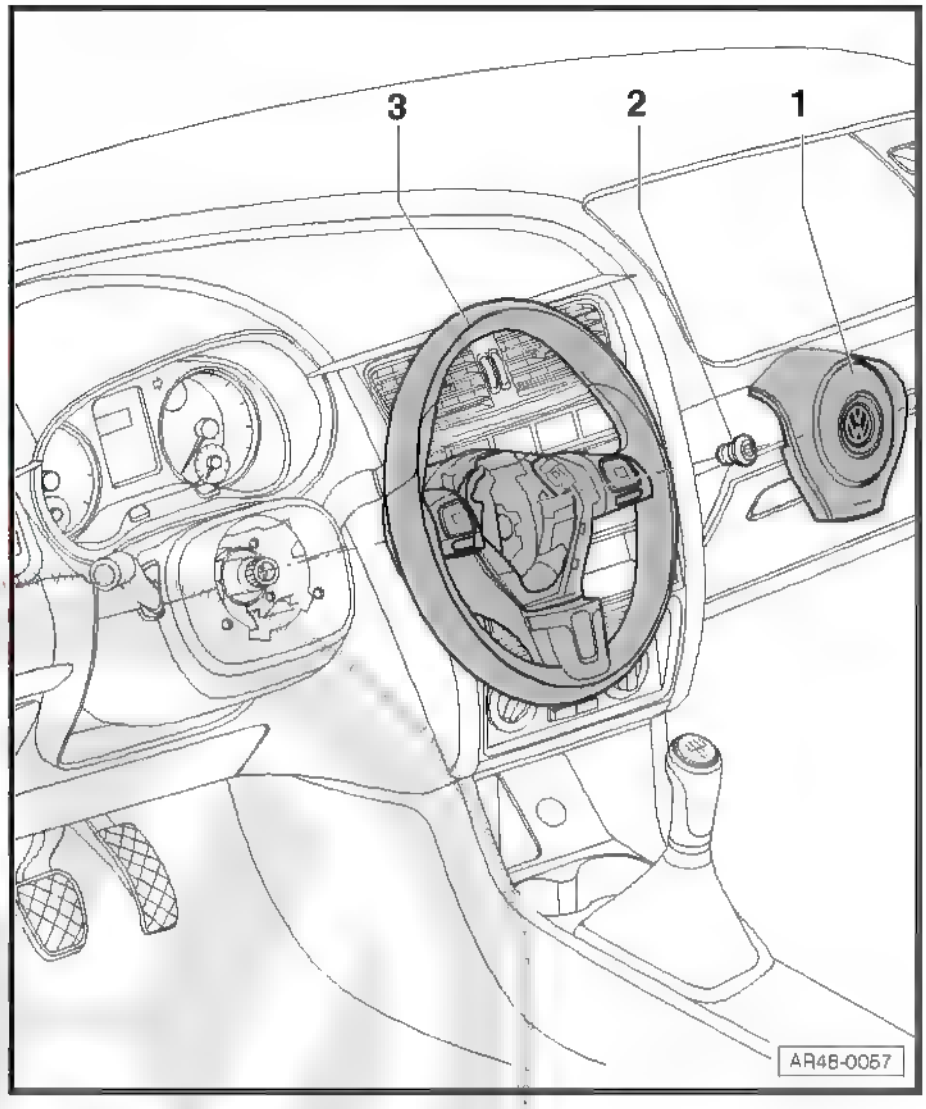


(from the model 2011 onwards - vehicles with multifunction steering wheel with or without airbags)

1 - Horn activator -H-

2 - Screw
- ❑ 30 Nm + 90°

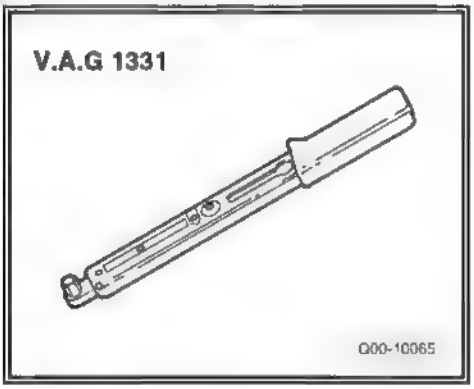
3 - Steering wheel
- ❑ When assembling, the centering marks on the steering wheel and the steering column shall coincide ⇒ page 89
- ❑ Remove and install ⇒ page 101



1.3 Steering wheel without airbag - remove and install

Special tools and workshop equipment required

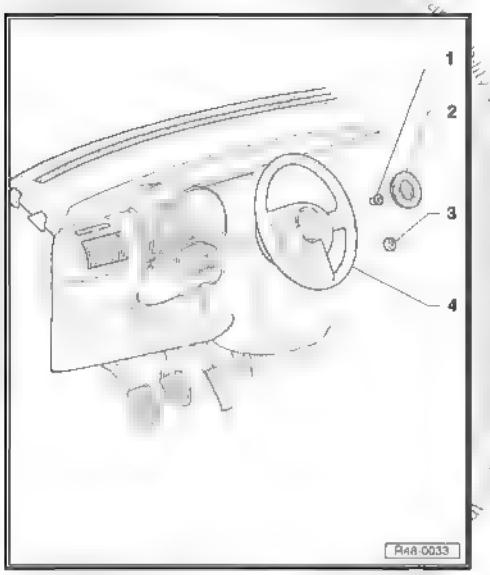
♦ "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-



1.3.1 Removal

– Straighten the wheels.

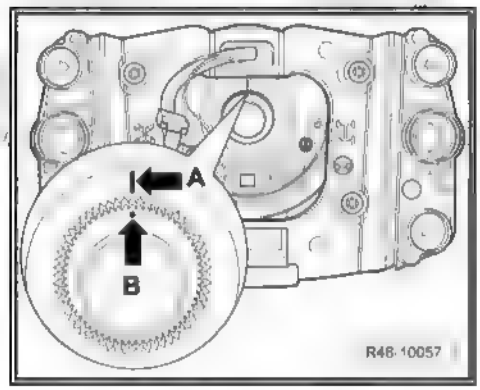
– Remove the Horn activator -H- -2- ⇒ page 97 .
– Remove the screw (internal multiple toothed) -1- or the nut -3-.



Note

Before removing the steering wheel, check whether the marking -arrow A- is aligned with the steering column punch point -arrow B-.

– Pull off steering wheel -4-.



1.3.2 Installation

– Install the steering wheel -4- on the steering column.

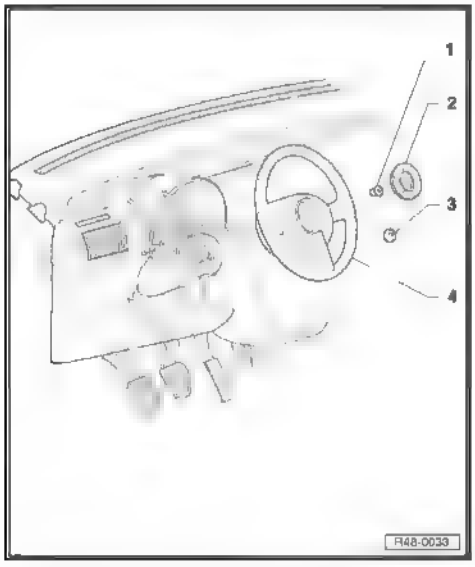
Note

The centre marks on the steering wheel and steering column shall match ⇒ page 89 .

– Install screw -1- to 30 Nm + 90° and mark with a punch point, or install nut.

or

– Install hex nut -3- to 50 Nm and mark with a punch point.



WARNING

The screw -1- can be used up to five times.

The nut -3- is only used on vehicles with fixed column.

– Install the Horn activator -H- -2- ⇒ page 97 .

2 Fixed steering column - repair

> **WARNING**
>
> *Always replace self-locking nuts and screws which were subjected to angular torque.*

2.1 Support and fixed steering column - assembly overview

(up to the model 2010)

1 - Fixed steering column
- ❑ Remove and install ⇒ page 104

2 - Hexagon screw
- ❑ 23 ± 2 Nm

3 - Hexagon screw
- ❑ 20 Nm
- ❑ Replace after each removal

4 - Bushing
- ❑ check condition after removing the steering column

5 - Hexagon screw
- ❑ 7 Nm

6 - Support

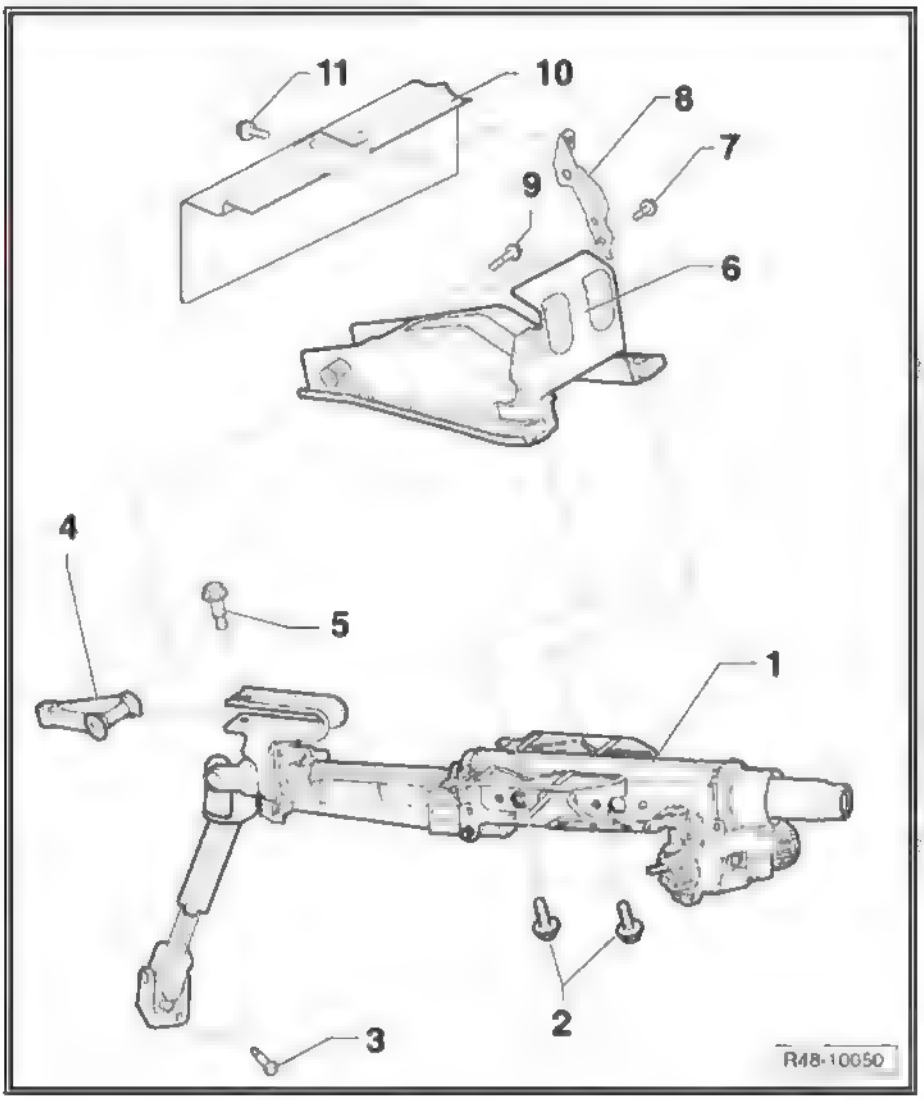
7 - Hexagon screw
- ❑ 23 Nm

8 - Right structure

9 - Hexagon screw
- ❑ M8 X 85
- ❑ 23 Nm

10 - Front panel

11 - Hexagon screw
- ❑ 25 Nm



(as from model-year 2011)

1 - Transverse support
- ❑ Remove and install. Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 70 ; Lining / Insulation

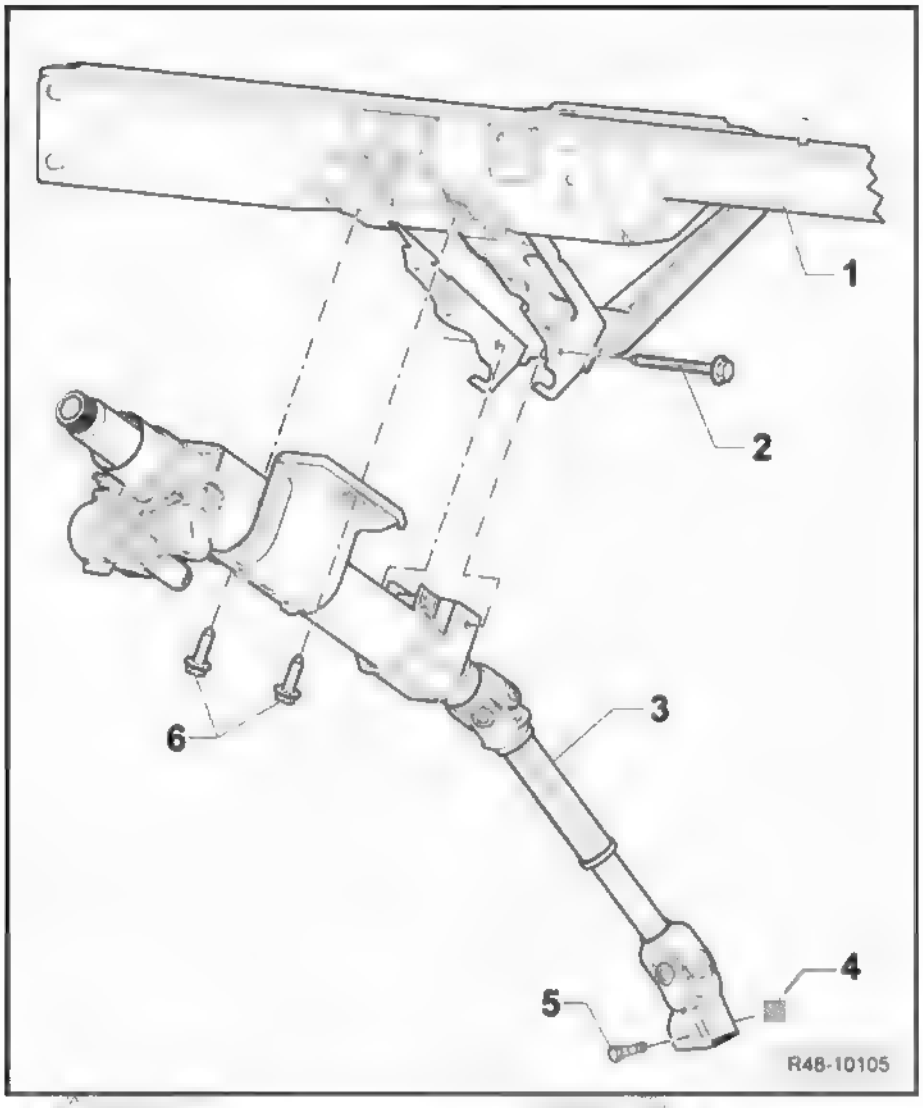
2 - Hexagon screw
- ❑ 8 Nm

3 - Fixed steering column
- ❑ Remove and install ⇒ page 104

4 - Hexagon nut
- ❑ 15 ± 1.5 Nm
- ❑ Replace after each removal

5 - Screw

6 - Hexagon screw
- ❑ 23 ± 2 Nm

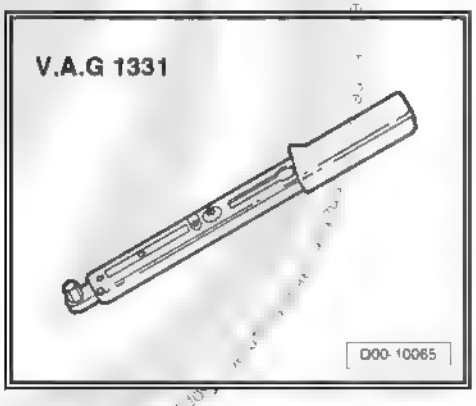


2.2 Fixed steering column - remove and install

2.2.1 Removal

Special tools and workshop equipment required

♦ "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-



The steering column is supplied complete as a replacement part.
Repair is not permitted.

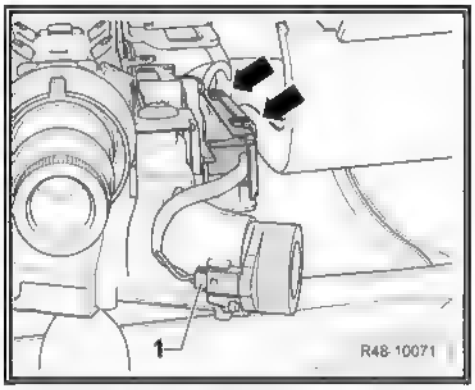
The switchbox cover can be transferred.

WARNING

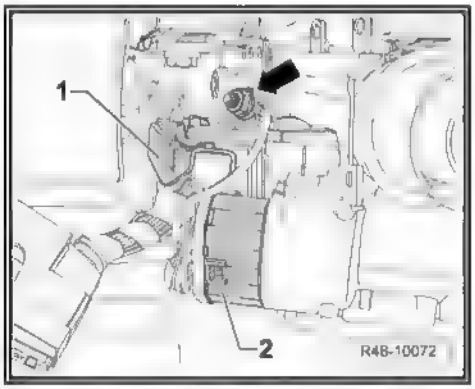
Before starting to work on the electric system and removing the steering wheel, the following conditions must be met:

- *Disconnect the battery earth strap Battery -A-. Please refer to manual ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery*
- *The wheels must be in the straight line position*

– Pull off steering wheel ⇒ page 97 .
– Remove the steering column coverings. Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 70 ; Lining / Insulation .
– Remove switch set. Please refer to manual ⇒ Electrical system; Rep. Gr. 94 ; Switches, lights and external lamps .
– Pull off connector -1- from the Immobilizer reading coil -D2- .
– Open the cable support (right side) in the tabs -arrows- and remove the wire.
– Disconnect the earth strap from the steering column -arrow-.
– Remove the earth strap and the support (left side) -1- from the switchbox cables.

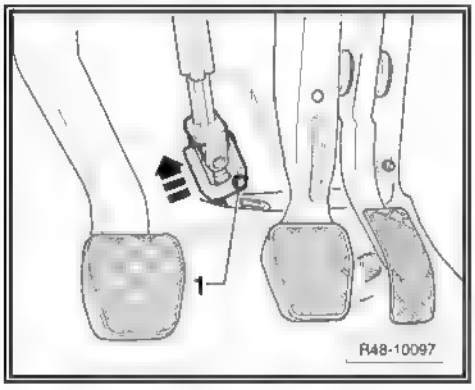


– Pull off connector -2- from the steering lock assembly.



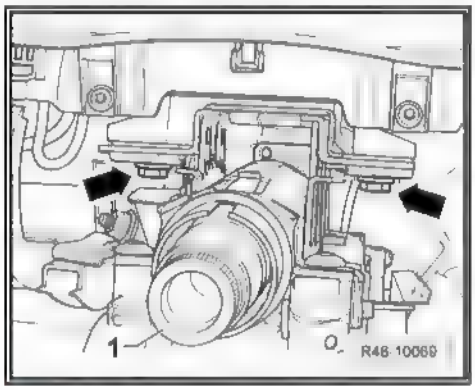
– Remove the screw -1- from the universal joint and disconnect the universal joint in the direction of the arrow.

If necessary, remove the access lid on the relay box to make work easier.

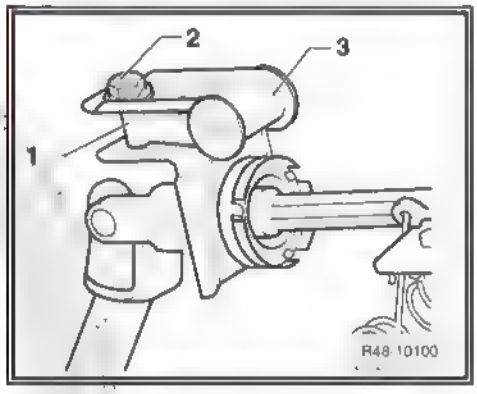


– Remove the screw -arrow- of pedal assembly (left side) -1- over the bracket steering column.

– Remove screws -arrows- , and pull the steering column -1- out of its housing.
– Remove the steering lock assembly. Please refer to manual ⇒ Electrical system; Rep. Gr. 94 ; Switches, lights and external lamps .
– Check steering column for damage ⇒ page 118 .



– If mounting bush -1- is damaged, remove it.
– Remove the screw -2-.
– Remove the bushing from support -1- from the steering column fork -3-.



Note

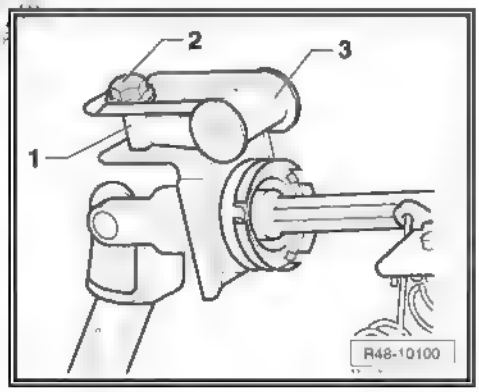
- *In case the steering column is replaced, then remove the support bushing -1- and install on the new shaft*
- *Before installing the mounting bush, check for damages*

2.2.2 Installation

Note

Self-locking screws and nuts must be replaced whenever removed

– If mounting bush -1- was removed because of damage, install a new mounting bush.



Note

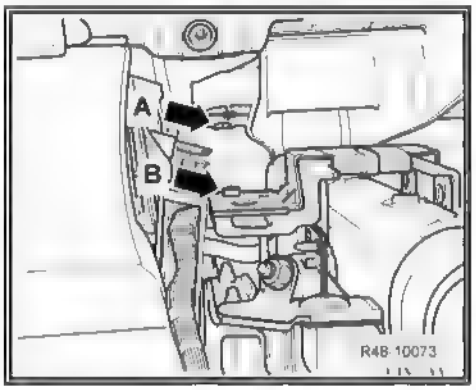
- *In case the steering column is replaced, the support bushing -1- from the old column must be installed on the new column*
- *Before installing the mounting bush, check for damages*
- *If the mounting bush is damaged, a new one must be installed*

– Install the steering column on the support

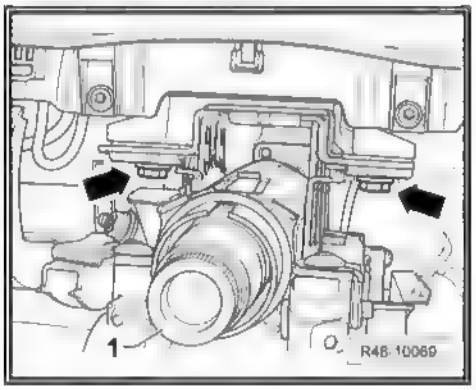
– Install screw -arrow- located to the right of the steering column support, above the pedals Tightening torque
⇒ Item 9 (page 103)

– Align the steering column with the support and install it.

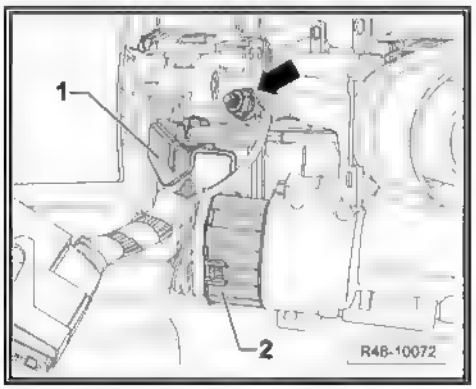
The hole -arrow A- and the pin -arrow B- should be aligned.

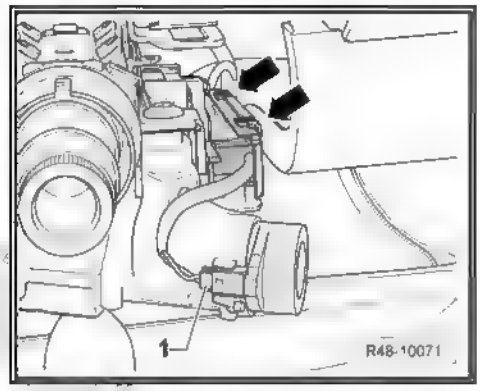


– Install and tighten the steering column screws -arrows-
⇒ Item 2 (page 103) .
– Install the universal joint on steering box pinion. Tighten the new fastening screw for the universal joint with
⇒ Item 3 (page 103) .



– Push on connector -2- from the steering lock assembly.
– Install the ground cable and the switchbox assembly cable on the cable bracket -1-.
– Connect steering column ground cable -arrow-.





- Install the cable to the support and close tabs -arrows-.
- Push on connector -1- from the Immobilizer reading coil -D2- .
- Install the steering lock assembly. Please refer to manual ⇒ Electrical system; Rep. Gr. 94 ; Switches, lights and external lamps .
- Install the steering column coverings Please refer to manual, ⇒ Body - internal mountings; Rep. Gr. 70 ; Lining / Insulation .
- Install trim for steering column switch. Please refer to manual ⇒ Electrical system; Rep. Gr. 94 ; Switches, lights and external lamps.
- Install the steering wheel:

without airbag: ⇒ page 101

with airbag: Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 69 ; Occupants' protection .

WARNING

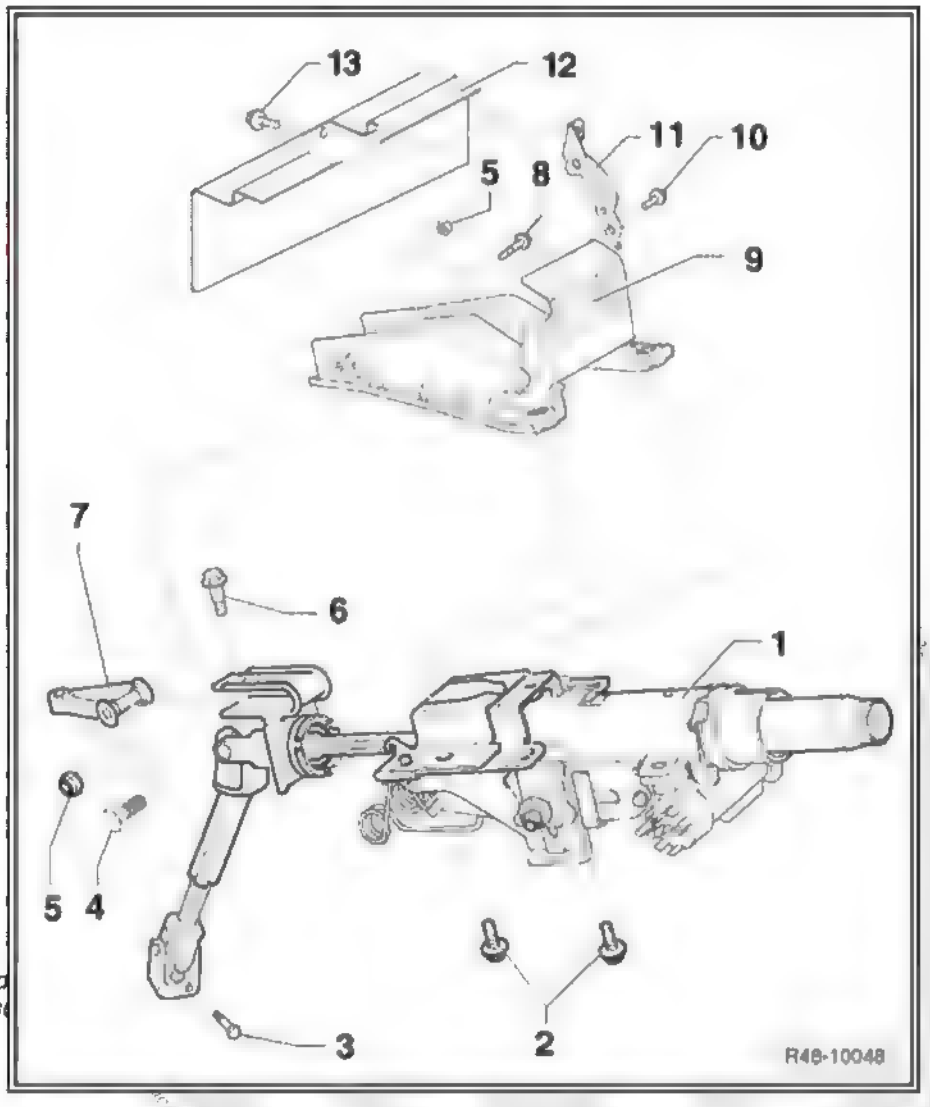
When connecting the Battery -A- make sure no one is inside the vehicle. Please refer to manual ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .

3 Steering column with adjustment - repair

> **WARNING**
>
> *Always replace self-locking nuts and screws which were subjected to angular torque.*

3.1 Support and steering column with adjustment - assembly overview

(up to the model 2010)



1 - Adjustable steering column
- ❑ remove and install ⇒ page 110

2 - Hexagon screw
- ❑ 23 Nm

3 - Hexagon screw
- ❑ 20 Nm
- ❑ replace after each removal

4 - Hexagon screw
- ❑ M6 X 63 = 10 Nm

5 - Self-locking nut
- ❑ replace after each removal

6 - Hexagon screw

7 Nm

7 - Bushing
- ❑ check condition after removing the steering column

8 - Hexagon screw
- ❑ M8 X 85 = 23 Nm
- ❑ M6 X 63 = 10 Nm

Note

Until 10.31.06 hex head 85 was used, without s nut

9 - Support

10 - Hexagon screw
- ❑ 23 Nm

11 - Right structure

12 - Front panel

13 - Hexagon screw
- ❑ 25 Nm

(as from model-year 2011)

1 - Transverse support
- ❑ Remove and install. Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 70 ; Lining / Insulation

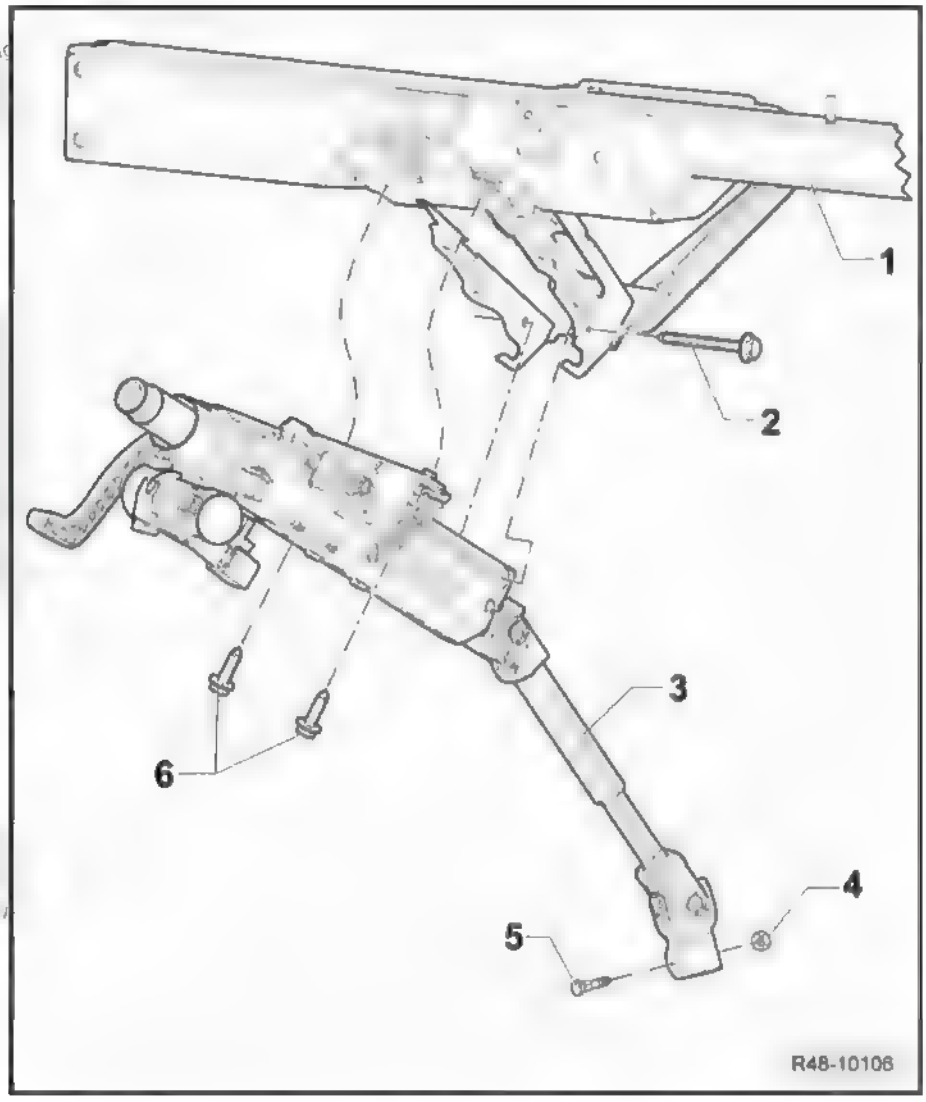
2 - Hexagon screw
- ❑ 8 Nm

3 - Adjustable steering column
- ❑ Remove and install ⇒ page 110

4 - Hexagon nut
- ❑ 15 ± 1.5 Nm
- ❑ Replace after each removal

5 - Screw

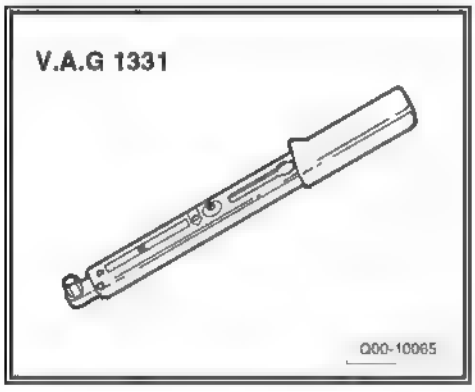
6 - Hexagon screw
- ❑ 23 ± 2 Nm



3.2 Adjustable steering column - remove and install

Special tools and workshop equipment required

- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-



3.2.1 Removal

The steering column is supplied complete as a replacement part. Repair is not permitted.

The switchbox cover can be transferred.

> **WARNING**
>
> *Before starting to work on the electric system and removing the steering wheel, the following conditions must be met:*
>
> - *Disconnect the ground cable from the battery. Please refer to manual ⇒ Electrical system; Rep Gr. 27 ; Starter, alternator, battery*
> - *The wheels must be in the straight line position*
>
> *If these instructions are not followed, the Airbag system, if fitted, may fail later*

– Set the wheels to the straight line position.

– Pull the lever below the steering column down.

– Pull the steering column downwards and remove it as much as possible.

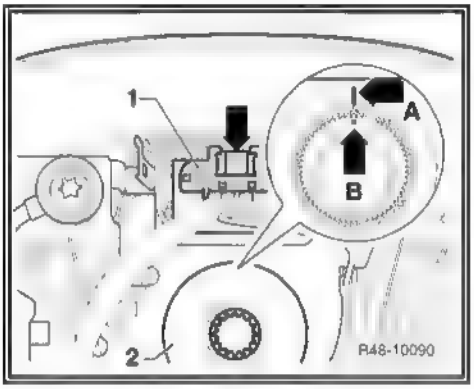
– Remove the driver's airbag unit (if any). Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 69 ; Occupants' protection .

Position the Airbag unit in such a way that it cannot be damaged or fall.

- It is not permitted to leave the Airbag units unattended

– Pull off connector -1- by pressing the lock -arrow- down.

– Remove the screw (internal multiple toothed) on the steering wheel -2-.



Before removing the steering wheel, check whether the marking -arrow A- is aligned with the punch point -arrow B-.

If this is not the case:

– Mark installation position of steering wheel to steering column using a felt tip pen or scriber for example.

– Remove the steering wheel ⇒ page 97 .

– Remove the steering column coverings. Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 70 ; Lining / Insulation .

Note

The upper lining can be completely removed only by subsequently removing the steering column

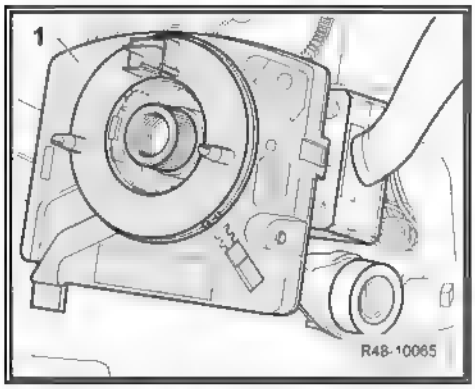
Vehicles with Electronic Stability Program "ESP".

Vehicles equipped with ESP are also equipped with the Steering angle sensor -G85- . It is fitted in the housing -1- along with the contact ring.

After performing works on the switchbox, check the basic adjustment of the Steering angle sensor -G85- ➤ page 117 .

Check if the front wheels are in the straight line position.

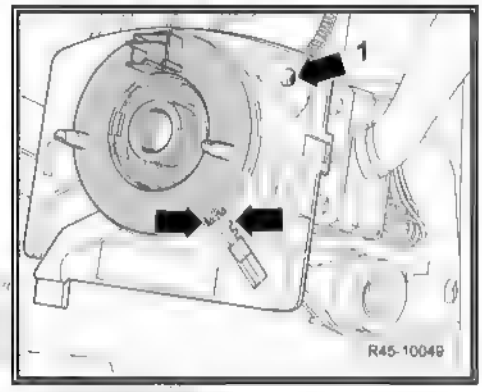
– Position the wheels in the straight line position and remove the steering wheel, if necessary.



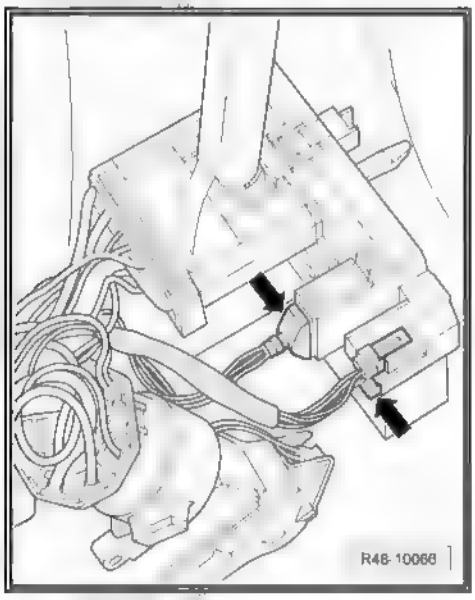
– Position the Steering angle sensor -G85- on the central position.

1 - A yellow dot must be visible through the hole -1-

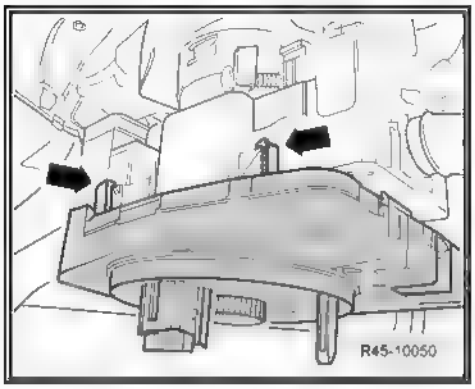
2 - The marks -arrows- must align



– Pull off connectors -arrows-.



– Lift the hooks carefully -arrows- and remove the steering angle sensor



Continued for all vehicles

– Remove switch set Please refer to manual ⇒ Electrical system, Rep. Gr. 94 ; Switches, lights and external lamps .

Note

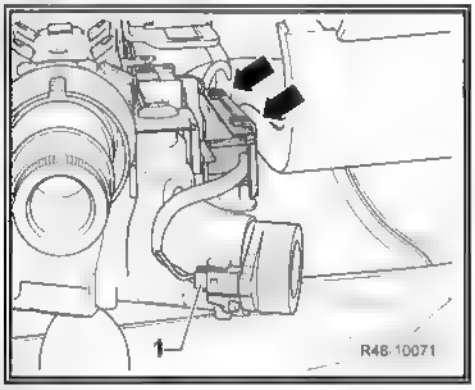
- *The column must be in the central position (wheels in straight line position) when the contact ring is removed and installed*
- *The contact ring supplied as a new part is locked in the central position through a cable clamp*

– Pull off connector -1- from the Immobilizer reading coil -D2- .

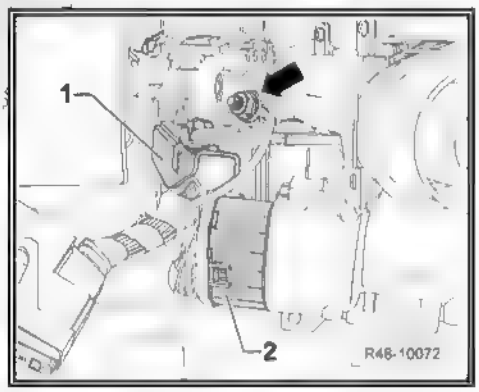
– Open the cable support (right side) in the tabs -arrows- and remove the wire.

– Disconnect the earth strap from the steering column -arrow-.

– Remove the earth strap and the support (left side) -1- from the switchbox cables.



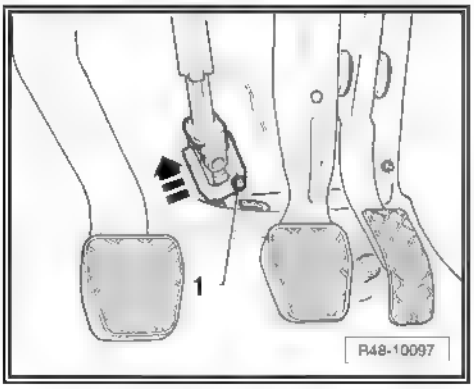
– Pull off connector -2- from the steering lock assembly.



– Remove the screw -1- from the universal joint and disconnect the universal joint in the direction of the arrow.

Remove the access lid on the relay box, to make work easier.

Vehicles with fastening screw located on the right side of the steering column

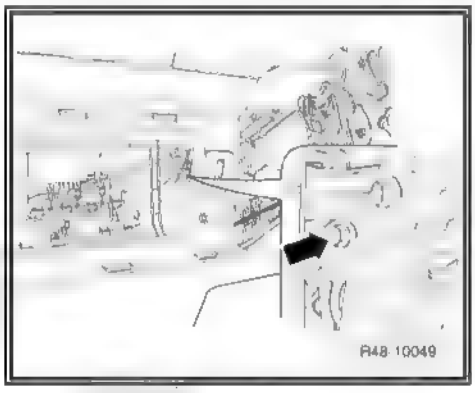


– Remove the screw -arrow- of pedal assembly (left side) -1- over the bracket steering column.

or

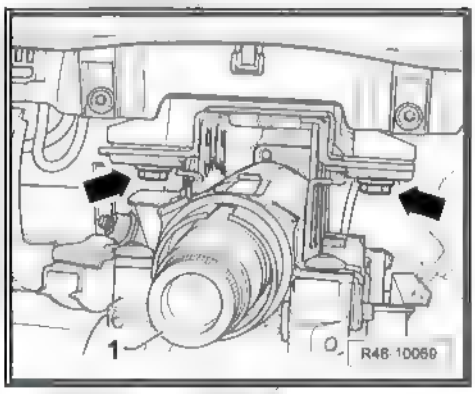
Vehicles with fastening screw located on the left side of the steering column

– Remove the screw -arrow- located on the left and the self-locking nut located on the right of the steering column support.
– Remove the screw -arrow- located on the left and the self-locking nut located on the right of the steering column support.
– Remove the clutch pedal command switch, if necessary.

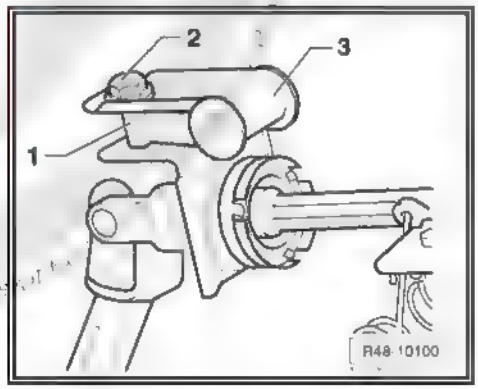


Continued for all vehicles

– Remove screws -arrows- , and pull the steering column -1- out of its housing.
– Remove the steering lock assembly. Please refer to manual ⇒ Electrical system; Rep. Gr. 94 ; Switches, lights and external lamps .
– Check steering column for damage ⇒ page 118 .



– If mounting bush -1- is damaged, remove it.
– Remove the screw -2-.
– Remove the bushing from support -1- from the steering column fork -3-.



Note

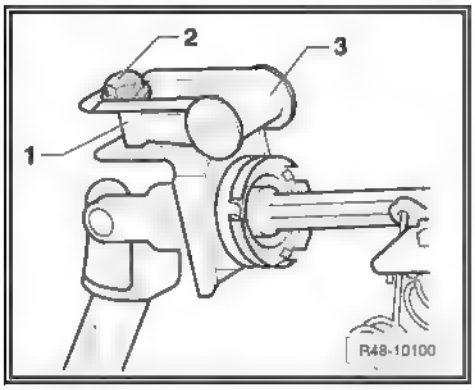
- *In case the steering column is replaced, then remove the support bushing -1- and install on the new shaft*
- *Before installing the mounting bush, check for damages*

3.2.2 Installation

Note

Self-locking screws and nuts must be replaced whenever removed.

– If mounting bush -1- was removed because of damage, install a new mounting bush.



Note

- *In case the steering column is replaced, the support bushing -1- from the old column must be installed on the new column*
- *Before installing the mounting bush, check for damages*
- *If the mounting bush is damaged, a new one must be installed*

– Install the steering column on the support.

Vehicles with fastening screw located on the right side of the steering column

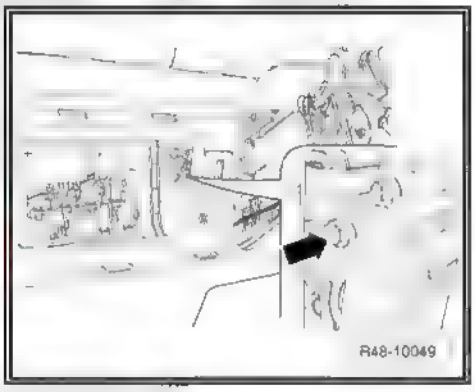
– Install screw -arrow- located to the right of the steering column support, above the pedals. Tightening torque ⇒ Item 8 (page 109) .

or

Vehicles with fastening screw located on the left side of the steering column

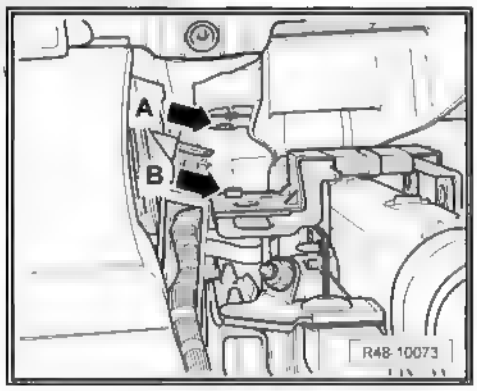
– Install screw -arrow- located on the left and the new self-locking nut located on the right of the steering column support. Tightening torque for the screw ⇒ Item 4 (page 109) .

– If removed, install the clutch pedal command switch.

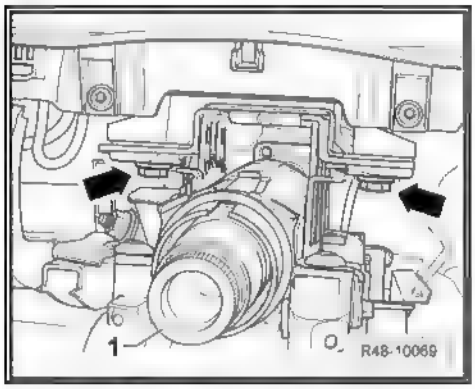


– Align the steering column with the support and install it.

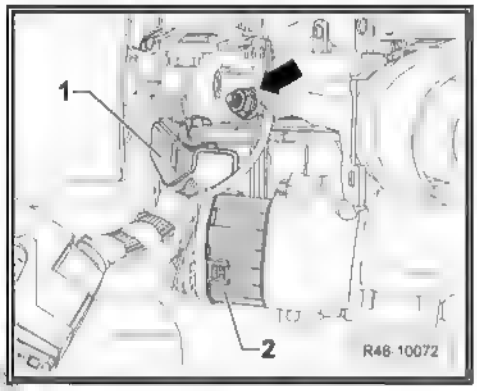
The hole -arrow A- and the pin -arrow B- should be aligned.



- Install and tighten the steering column screws -arrows- ➔ Item 2 (page 109) .
- Install the universal joint on steering box pinion. Tighten the new fastening screw for the universal joint ➔ Item 3 (page 109) .



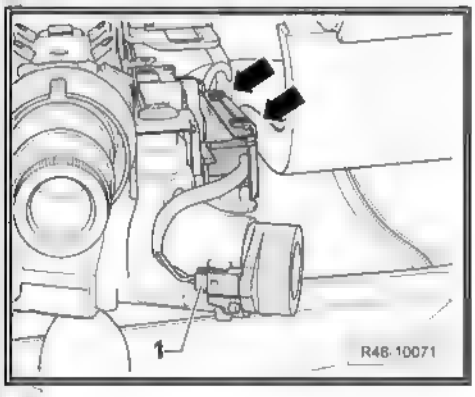
- Push on connector -2- on the steering lock assembly.
- Install the ground cable and the switchbox assembly cable on the cable bracket -1-.
- Connect steering column ground cable -arrow-.



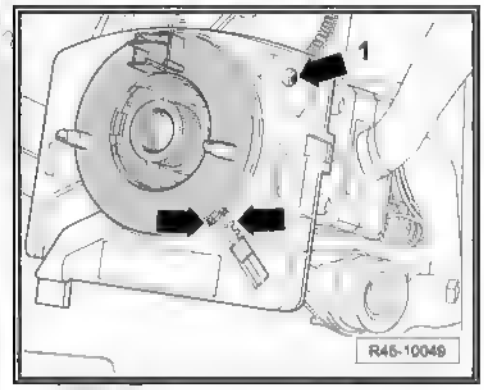
- Install the cable to the support and close tabs -arrows-.
- Push on connector -1- from the Immobilizer reading coil -D2- .

The work sequence below refers only to vehicles with ESP:

- Position the Steering angle sensor -G85- until the tabs fit.
- Remove the transport protection when a new Steering angle sensor -G85- is installed.



– Position the Steering angle sensor -G85- on the central position.



1 - A yellow dot must be visible through the hole -1-

2 - The marks -arrows- must align

Make sure that the central position is maintained

The basic adjustment for the steering angle sensor must be checked after the assembly works:

- when the Steering angle sensor -G85- was removed or replaced
- after the steering column is removed or replaced
- after the switchbox is removed or replaced
- after removing or replacing the steering lock assembly
- when the steering wheel is not in the straight line position

Check the basic adjustment of the Steering angle sensor -G85-

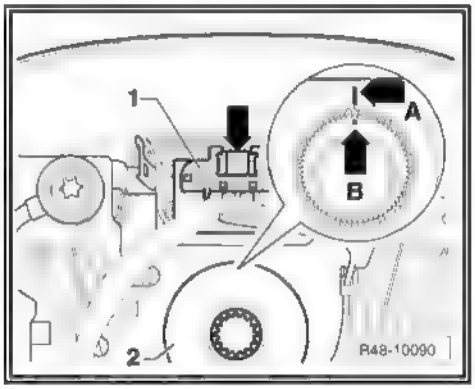
– Connect the Diagnosis, Measurement and Information System -VAS 5051- , and follow the instructions on the screen.

Continued for all vehicles

– Install the steering lock assembly. Please refer to manual ⇒ Electrical system; Rep. Gr. 94 ; Switches, lights and external lamps .

– Install the steering column coverings. Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 70 ; Lining / Insulation .

– Install trim for steering column switch. Please refer to manual ⇒ Electrical system; Rep. Gr. 94 ; Switches, lights and external lamps .



– Install the steering wheel so that the mark -arrow A- on the steering wheel and the mark -arrow B- on the steering column align.

– Observe eventual additional marks.

Note

Steering columns supplied as a spare part do not have a centre punch mark.

– Install the steering wheel:

without airbag: ⇒ page 101

with airbag: Please refer to manual ⇒ Body - internal mountings; Rep. Gr. 69 ; Occupants' protection .

– Push on connector -1-.

Install by inverting the removal sequence.

WARNING

When connecting the Battery -A- make sure no one is inside the vehicle. Please refer to manual ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .

3.3 Steering column - check

3.3.1 Visual checking

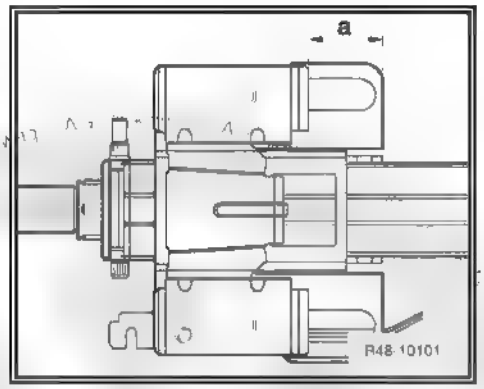
– Check all steering column parts for damages

3.3.2 Check the operation

– Check whether the steering column turns easily and without interference

– Check whether the steering column can be adjusted for height and length.

– Check measurement -nd-.



Measurement -nd-: minimum of 37 mm.

– If measurement -nd- is below 37 mm, the steering column is damaged and must be replaced.

4 Power steering box - repair

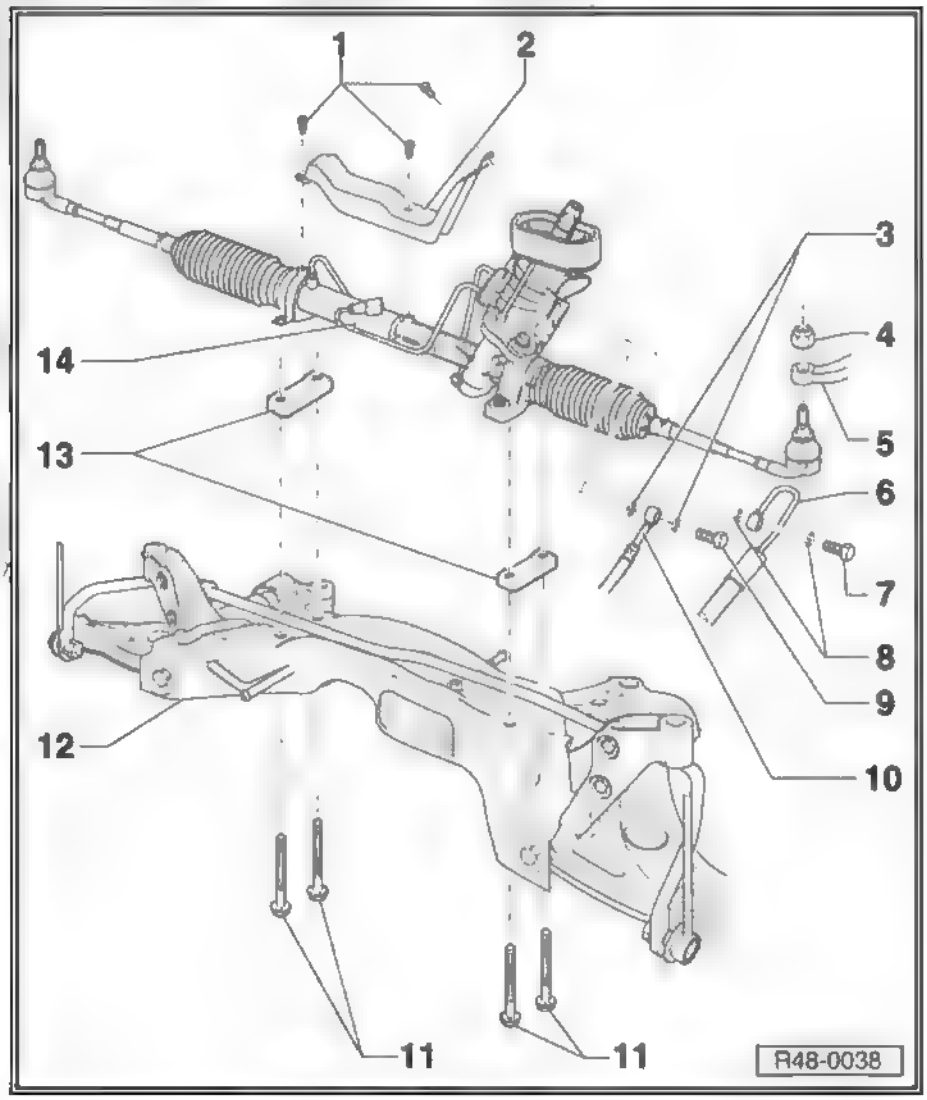
4.1 Power steering box - assembly overview

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

Note

- *Repairs in the steering box are not expected. In case of complaints, replace the entire steering box*
- *Soldering and straightening works in the steering parts are not permitted*



1 - Screw
- ❑ 8 Nm

2 - Heat shield
- ❑ See the ⇒ Electronic Parts Catalogue (ETKA)

3 - Seal ring

4 - Hexagon nut
- ❑ 20 Nm + 90°
- ❑ replace after each removal

5 - Steering arm

6 - Pressure hose

7 - Hollow screw
- ❑ 38 Nm

8 - Seal ring

9 - Hollow screw
- ❑ 38 Nm

10 - Return hose

11 - Hexagon screw
- ❑ 50 Nm + 90°
- ❑ replace after each removal
- ❑ Refer to: ⇒ Electronic Parts Catalogue (ETKA)

12 - Subframe
- ❑ Observe the notes on repair work

13 - Spacer
- ❑ only for SpaceCross and SuranCross

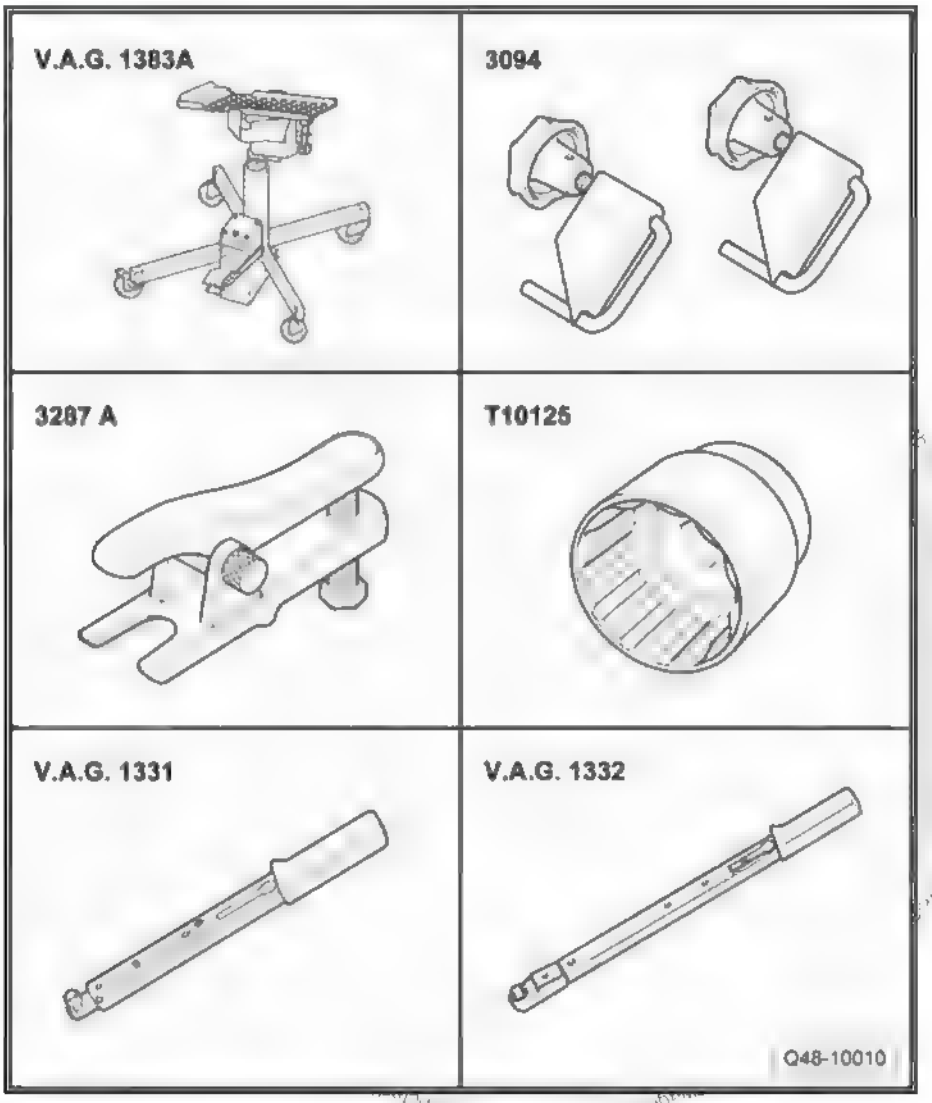
14 - Steering box

- ❑ remove and install ➔ page 120

4.2 Power steering box - remove and install

Special tools and workshop equipment required

- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A-
- Clamps (diam. 25 mm) -3094-
- Extractor -3287A-
- Star socket 36 mm or Gedore Ref. D32-36 -T 10125-
- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-

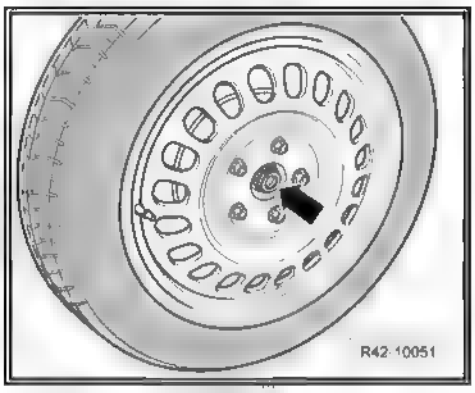


4.2.1 Notes related to installation works in the power steering box

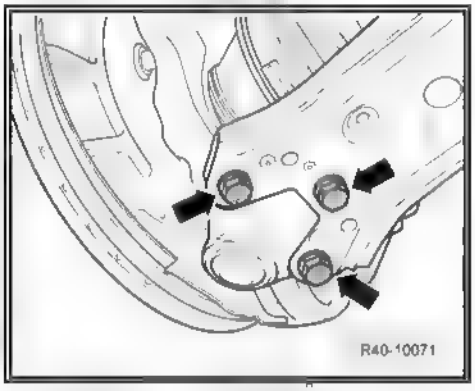
- On works to be performed on the power steering box, it is necessary to follow strict cleaning measures.
- Carefully clean the threaded joints and the surrounding area before loosening them.
- Place the parts removed over a clean base and cover them it the repair is not performed immediately.
- Do not use cloths that lint
- Remove the replacement parts from the package only when proceeding with the installation.
- Use only original parts

4.2.2 Removal

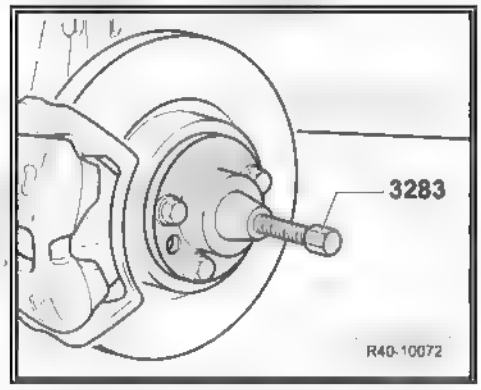
- First, check if a code radio equipment is installed If this is the case, request the anti-theft code
- Disconnect the ground cable from the battery. Please refer to manual ⇒ Electrical system; Rep Gr. 27 , Starter, alternator, battery .
- Lift the vehicle until the front axle is without any load
- Loosen the grooved nut -arrow- with the Star socket 36mm or Gedore Ref D32-36 -T 10125- or the 30 mm star socket
- Remove the wheel.
- Mark the position for the swivel tip screws on the wishbone



- Remove screws -arrows-.
- Move the suspension column together with the swivel joint on the wishbone.



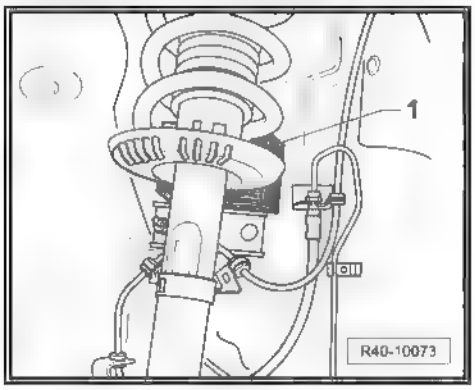
- Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.



Note

While pressing the drive axle shaft outwards, make sure you have enough free space.

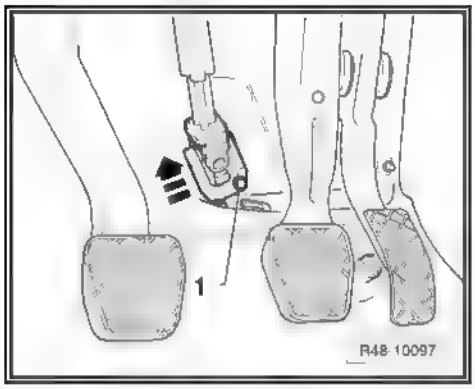
- Remove the wheel roller bearing case with the shaft articulation out of the transverse arm
- Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing
- Fasten the drive axle shaft to the body with a wire.



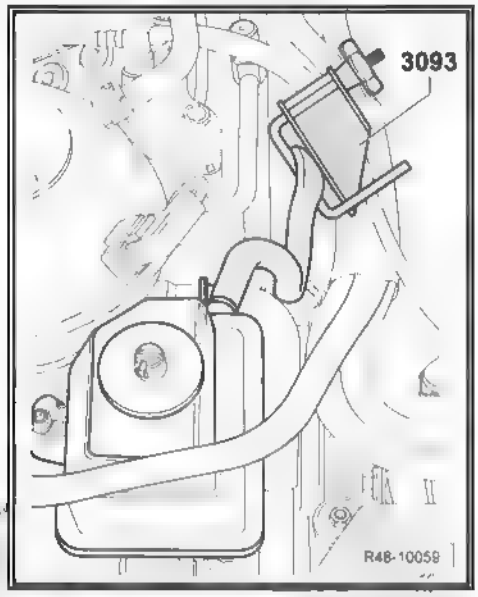
Note

The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.

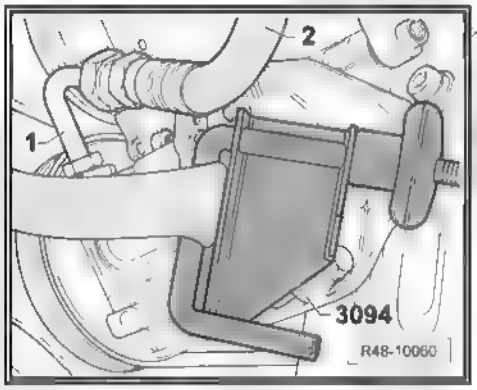
– Remove the screw -1- from the universal joint and remove the universal joint in the arrow direction.



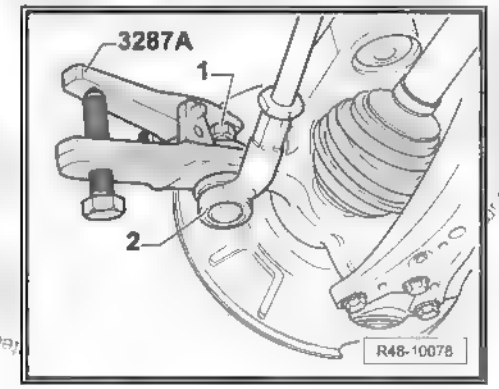
– Loosen the flexible tube from the transmitting cylinder reservoir and remove it by using the Clamps (diam. 25 mm) -3094- .



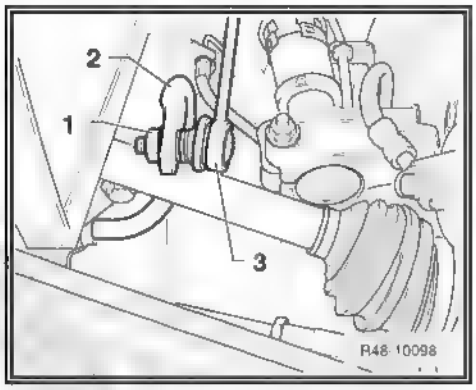
– Release the flexible tube from the rotary pump by removing the Clamps (diam. 25 mm) -3094- .



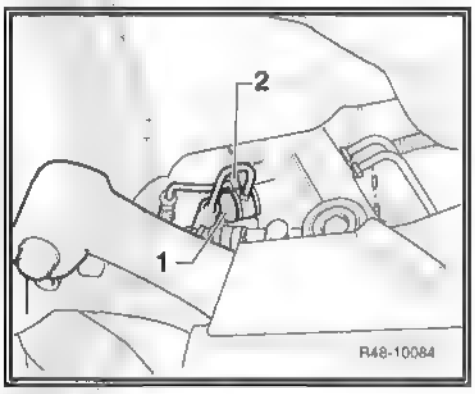
– Remove the nut -1- of connection rod
– Detach the steering track rod ball point -2- from the steering knuckle arm.



– Remove the hexagonal nut -1- from the anti-roll rod on both sides.
– Remove the rods -3- of stabilizer -2-.



– Remove the hollow screw of the pressure duct -1- (19-mm wrench measurement) of steering gear housing.
– Remove the connecting screw of the return duct -2- (17 mm wrench measurement) of steering gear housing.
– Seal the ducts with a plastic bag and adhesive tape.
– Seal the threaded holes of the hydraulic power steering box with threaded plastic plugs.
– Remove the subframe. ⇒ page 22 .
– Remove the power steering box from behind.



4.2.3 Installation

Note

- *Use new sealants for the hoses/ducts*
- *Coat steering box seals with lubricant, e.g. soft soap, before installing steering box*
- *After fitting the steering box in the universal joint of the column, make sure that the joint is against the assembly plate, without twisting, and that it seals the opening for the pedal area correctly. There may be noises and/or water may come in*
- *Make sure that the sealing surfaces are clean*
- *When replacing the power steering box, replace the steering yoke bellows*

Before installing the subframe screws, position the hydraulic power steering box on the subframe and install the screws for the power steering box.

– Fasten the subframe.
– Install the drive shaft in the wheel roller bearing.
– Fasten the swivel tip to the wishbone (screws on old marks)

Note

- *Use new screws!*
- *Check if the protective bellows are not damaged or twisted*

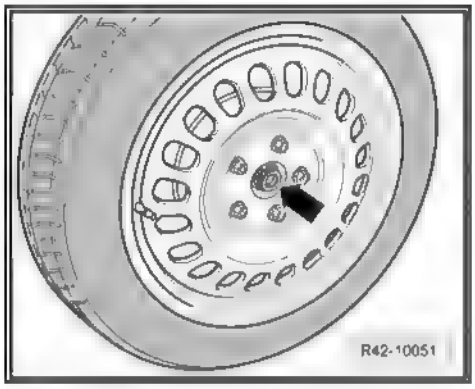
– Fasten the steering box to the subframe.
– Fasten the steering yoke to the steering arm.

– Install the return hose and tighten the connecting screw.

Note

Make sure that the pressure duct does not interfere on the body and the subframe

– Install the wheels and tighten the screws.
– Tighten the splined nut -arrow- with the Star socket 36mm or Gedore Ref. D32-36 -T 10125- or the 30 mm star socket ⇒ Item 1 (page 60) .
– Install the universal joint on steering box pinion.
– Install the hex head screw from below and tighten it.
– Replenish the hydraulic oil level ⇒ page 141 .



After the installation, you must check the steering wheel position through a test drive.

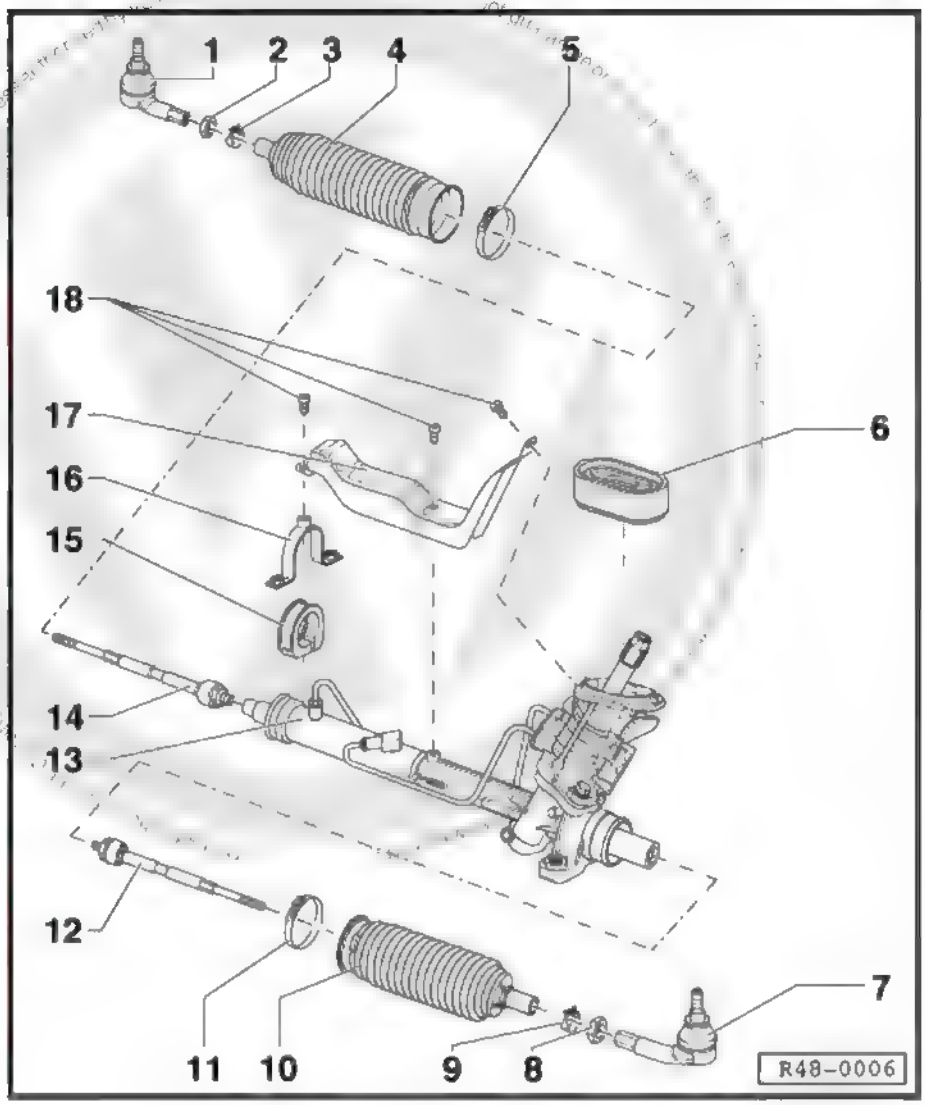
If the steering wheel is not in straight ahead position, the front axle alignment must be checked and if necessary adjusted!

– Check alignment ⇒ page 89 .

4.3 Power steering box - disassemble and assemble

Note

- *Always replace self-locking nuts and screws which were subjected to angular torque.*
- *It is not permitted to repair the power steering box. In case of complaints, replace the entire steering box.*
- *Welding and straightening work on steering components are not permitted.*
- *Type of oil: Hydraulic oil -325 029 011-*
- *Oil quantity in the system: 0,7 ... 0.9 l*



1 - Right steering track rod ball joint
- ❑ marked with "C"
- ❑ check: ⇒ page 128
- ❑ note the assembly position ⇒ page 128

2 - Hexagon nut
- ❑ 50 Nm

3 - Clamp

4 - Protection cover
- ❑ must not be twisted after the alignment
- ❑ remove the steering box to replace it

5 - Clamp
- ❑ fasten ⇒ page 127
- ❑ replace - open with pliers

6 - Gasket

7 - Left steering track rod ball joint
- ❑ marked with "D"
- ❑ check: ⇒ page 128

8 - Hexagon nut
- ❑ 50 Nm

9 - Clamp

10 - Protection cover
- ❑ must not be twisted after adjusting the alignment
- ❑ remove the steering box to replace it

11 - Clamp
- ❑ fasten ⇒ page 127
- ❑ replace - open with pliers

12 - Right steering track rod
- ❑ supplied along with the steering box as a replacement part

13 - Steering box

14 - Left steering track rod
- ❑ supplied along with the steering box as a replacement part

15 - Rubber bearing

16 - Clamp with nuts
- ❑ replace if threads are damaged

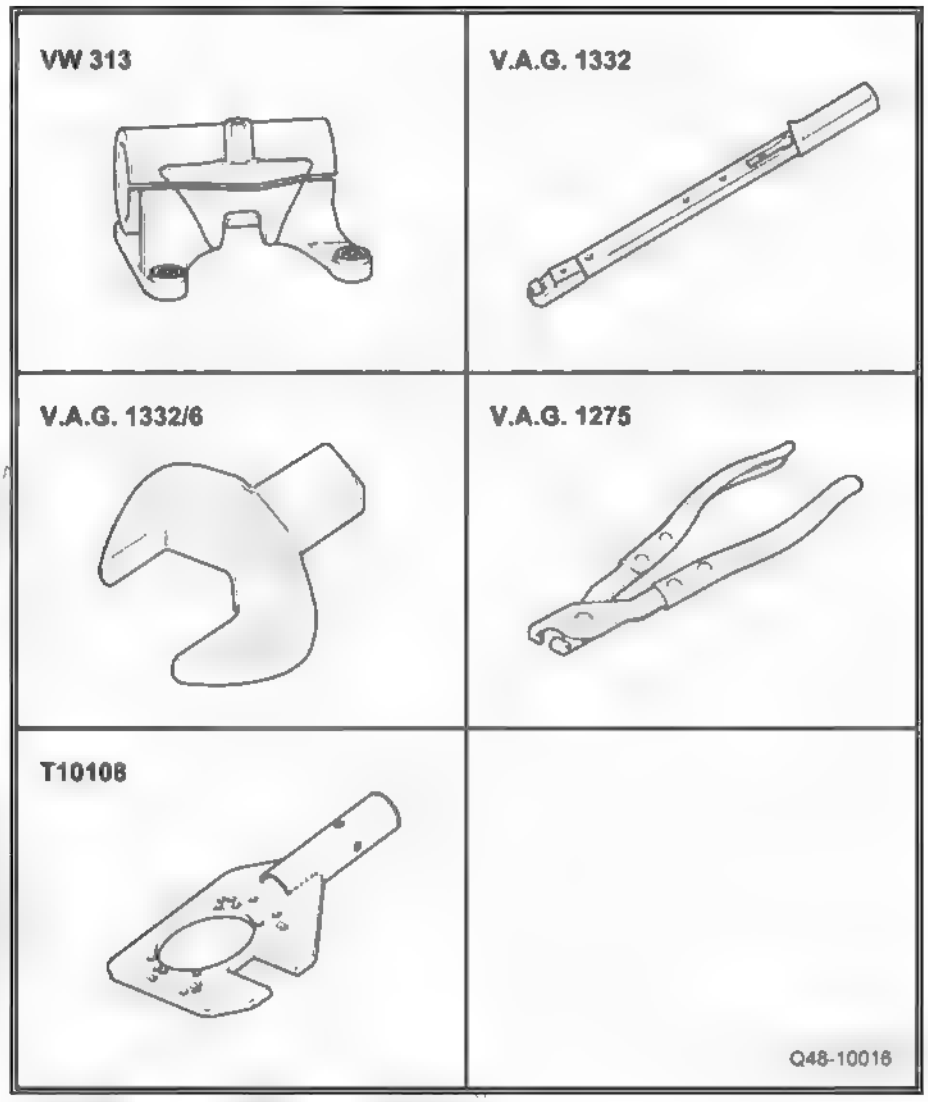
17 - Heat shield

18 - Screw
- ❑ 8 Nm

4.4 Steering track rod - remove and install

Special tools and workshop equipment required

- Support for VW643 or VW 643/1 -VW 313-
- Torquemeter - 40 to 200 Nm (socket 1/2") -VAG 1332-
- Spanner insert 32 -VAG 1332/6-
- Clamp pliers or VW 004V - VAG 1275-
- Support for transmission - T10108-



4.4.1 Removal

Note

The steering bars can only be removed and installed with the steering box removed.

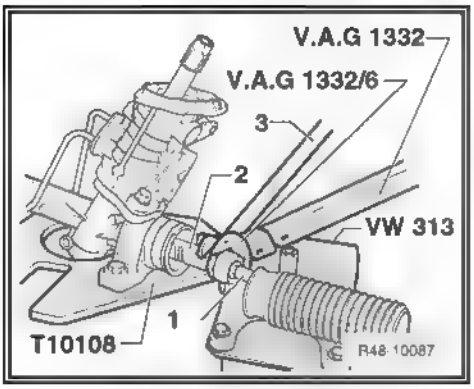
– Close the steering box pipes if this has not been done yet

– Clean the steering box on the outer part along with the covers.

To disassemble the right steering bar, open the left caul tightening clamp and push it backwards, because, to release the right steering bar, it is necessary to press against the left gear rack.

– Open tightening clamp and push the cover backwards

– Attach the steering gear housing to Support for transmission -T10108- and untighten the steering bar -1- from the gear rack -2-.



4.4.2 Installation

The installation is performed in the reverse sequence from the removal.

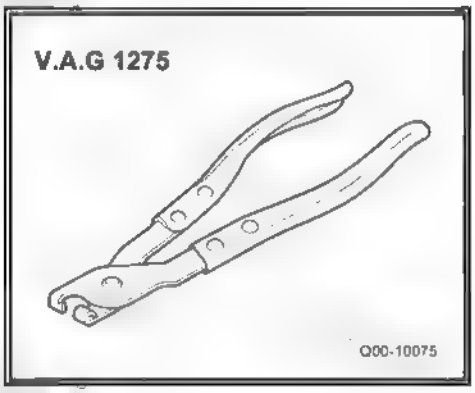
To fasten the steering box, use the hole "5" and the proper gearbox support hole, located on the front.

Tightening torque:	
Steering bar to steering box	80 Nm

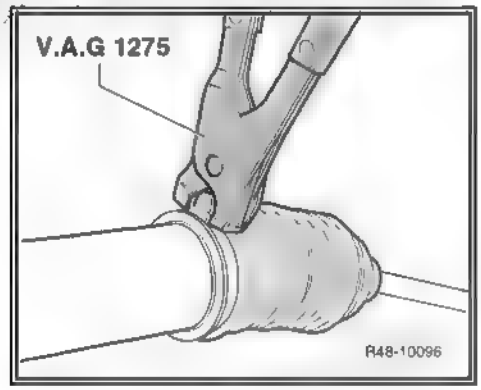
4.5 Protective caul - assemble

Special tools and workshop equipment required

- Clamp pliers or VW 004V -VAG 1275-



– Check the protection cover for wear (cuts, cracks) and ensure that seal surfaces are clean.
– When installing the protective caul, turn the steering yoke first so that the bar ball pin gets in the installation position.
– Attach the clamp with Clamp pliers or VW 004V -VAG 1275-



Note

- *Use only original clamps*
- *Under no circumstances shall the protective caul be installed twisted (misaligned)*

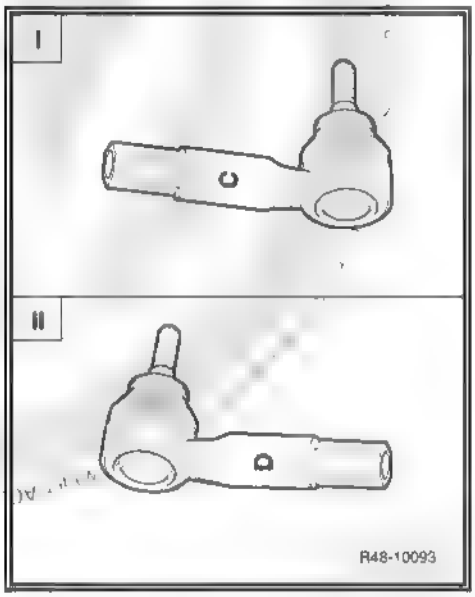
4.6 Clearance, fastening and protective cauls from the steering yoke tips - check

- With the lifted vehicle (wheels hanging free), check the play by moving the steering track rods and wheels Play: without play
- Check fastening.
- Check the sealing bellows for damages and correct fitting

4.7 Correspondence of the steering yoke tips

I - The right steering yoke tip is marked with -C-

II - The left steering yoke tip is marked with -D-

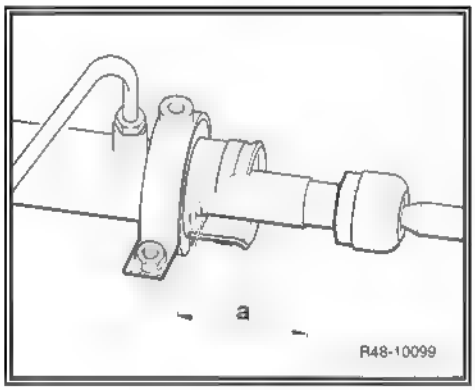


4.8 Gear rack centering - determine

Before proceeding with the power steering box installation, install the rack on the central position.

- Move the gear rack until the dimension -nd-.

1 - Measurement -nd- = 75.5 mm



5 Hydraulic pump (power steering) - repair (valid for all engines, except CCRA and CFZA)

5.1 Hydraulic pump with hydraulic piping and hoses - assembly overview

I - Vehicles with hydraulic pump on the upper part

- ❑ Assembly overview ⇒ page 131

II - Vehicles with hydraulic pump on the lower part

- ❑ Assembly overview ⇒ page 132

1 - Compensation reservoir

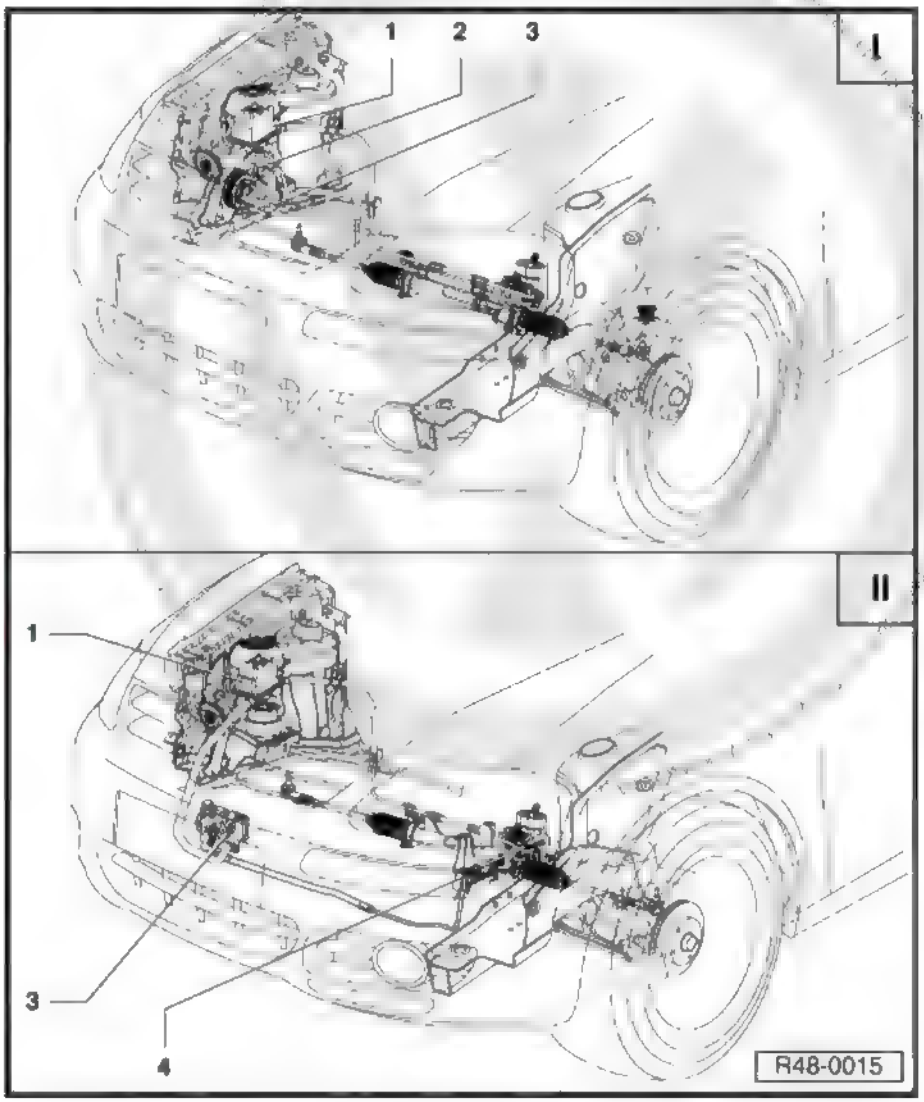
- ❑ Assembly overview ⇒ page 130

2 - Fitting of return piping on the pressure piping

3 - Fitting of return piping on the pressure piping

- ❑ Operating pressure - check ⇒ page 136

4 - Fitting of pressure piping onto gearbox



5.1.1 Compensation reservoir - assembly overview

1 - Reservoir cover with measuring rod
- ❑ Oil level between the "min" and "max". marks, engine temperature approx 50 °C
- ❑ Arrow A. oil level when the engine is cold
- ❑ With engine cold, oil level cannot exceed the min. marking
- ❑ Check the oil level with reservoir cover installed

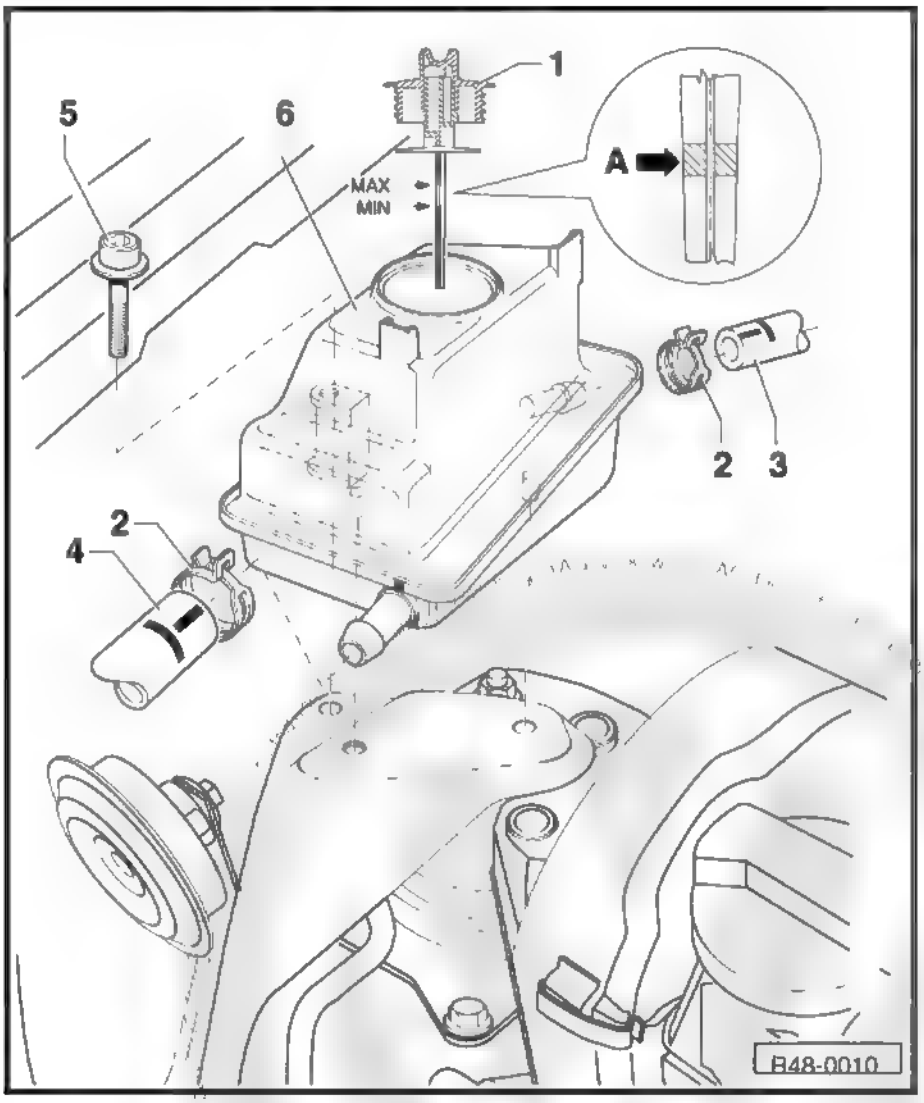
2 - Clamp

3 - Flexible return tube

4 - Flexible suction tube

5 - Internal hex head screw
- ❑ 10 Nm

6 - Compensation reservoir



5.2 Hydraulic pump on the upper part - assembly overview

1 - Support

2 - Screw
- ❑ 23 Nm

3 - Hydraulic pump
- ❑ Remove and install ⇒ page 132
- ❑ Check operation pressure ⇒ page 136

4 - Sealant

5 - Hollow screw
- ❑ 38 Nm

6 - Pressure piping

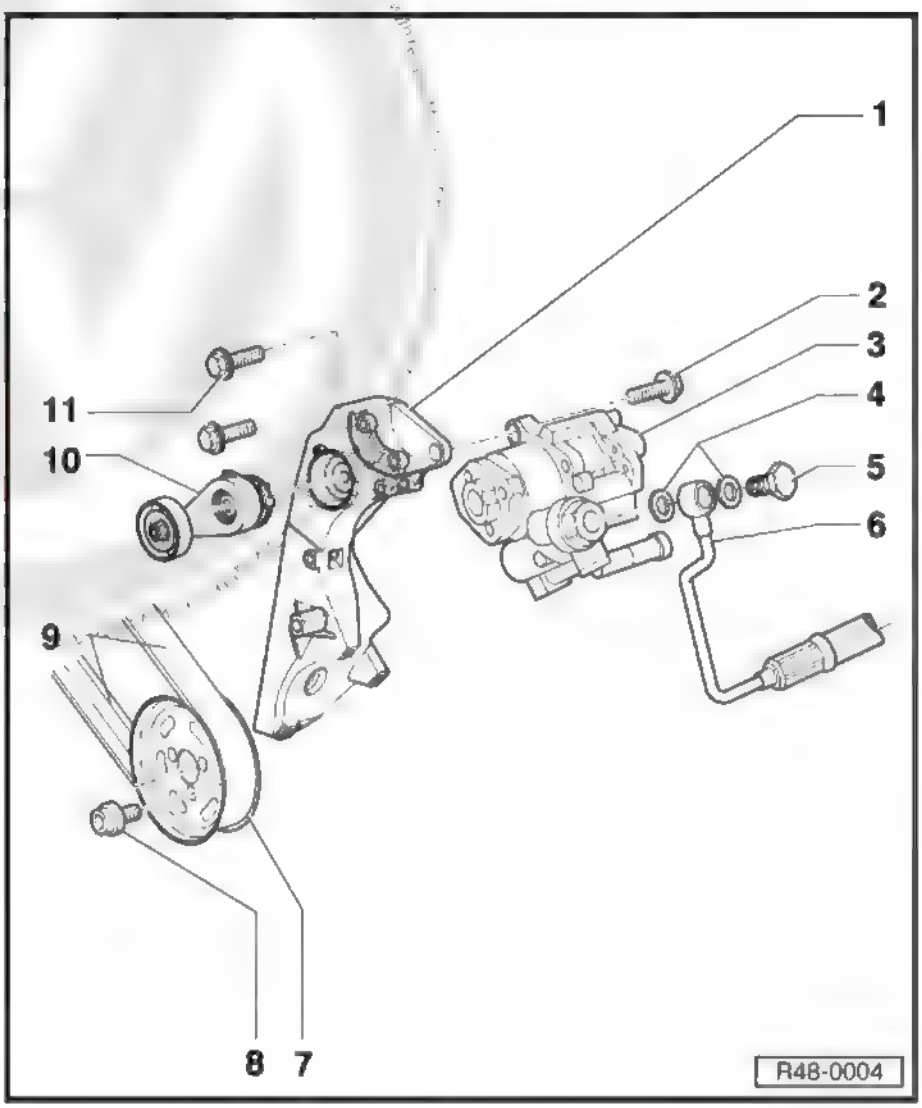
7 - Poly-V belt pulley

8 - Screw
- ❑ 23 Nm

9 - Poly-V belt

10 - Poly-V belt tensioner device

11 - Screw
- ❑ 23 Nm



5.3 Hydraulic pump on the lower part - assembly overview

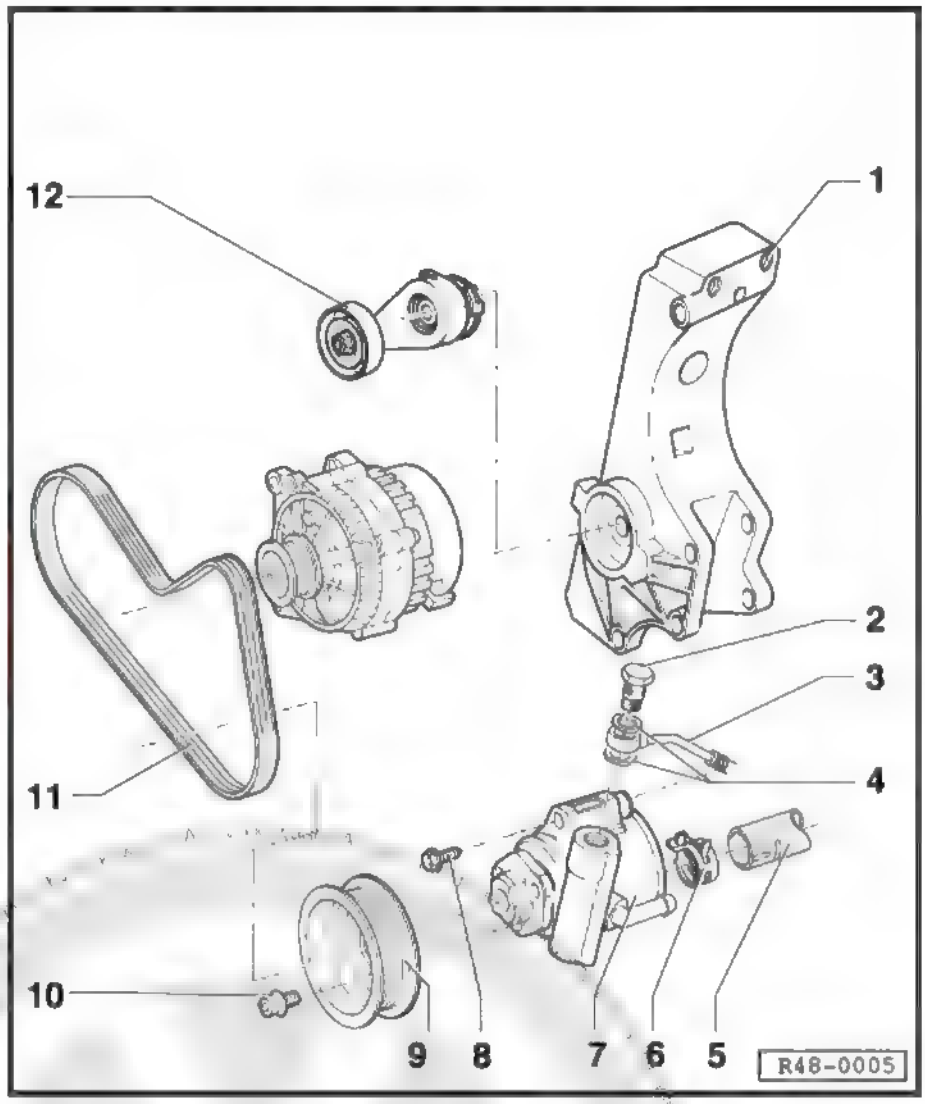
1 - Support
2 - Hollow screw
- ❑ 38 Nm

3 - Pressure piping
4 - Sealant
5 - Suction tube
6 - Clamp
7 - Hydraulic pump
- ❑ Remove and install ⇒ page 134
- ❑ Check operation pressure ⇒ page 136

8 - Screw
- ❑ 23 Nm

9 - Poly-V belt pulley
10 - Screw
- ❑ 23 Nm

11 - Poly-V belt
12 - Poly-V belt tensioner



5.4 Vehicles with hydraulic pump on the upper part - remove and install

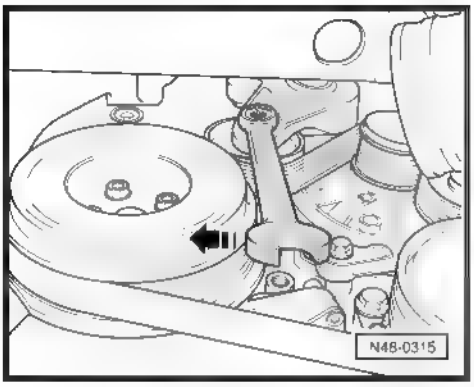
Note

- *Spare pumps are not filled with oil. Thus, before performing the installation, fill it with Hydraulic Oil -325 029 901 1- and turn them manually. Otherwise, noises may appear during the operation or damages to the pump.*
- *Oil quantity in the system: 0,7 ... 0.9 l.*

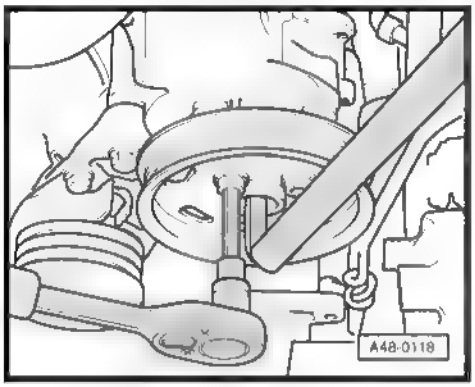
5.4.1 Removal

– Mark Poly-V belt operation direction.

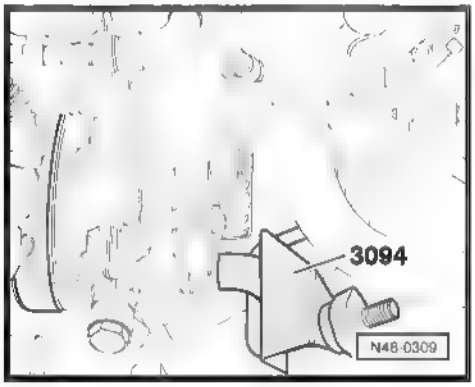
- In order to relieve the Poly-V belt, displace the tensioner towards the -arrow-
- Remove the Poly-V belt



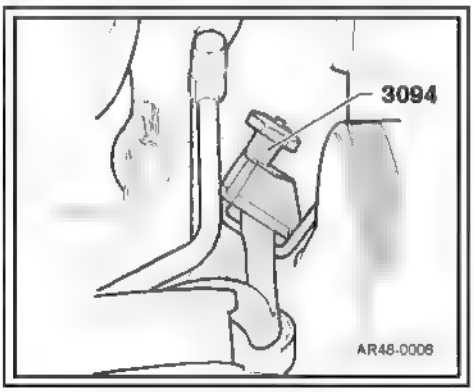
- Loosen the screws of Poly-V belt and lock it, if necessary.
- Remove the pump pulley.
- Remove the pump intake hose.



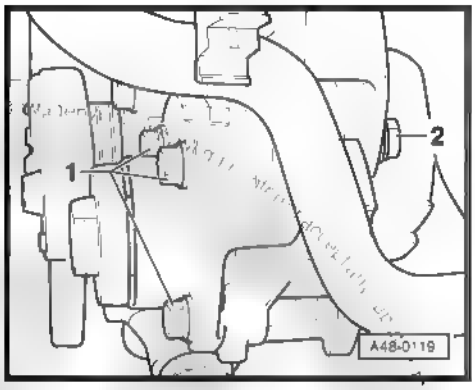
- Close the intake hose with a Clamp (diam. 25 mm) -3094- .
- Remove the intake hose, loosening the clamp with Space-Saver clamp pliers -VW 5163 (VWB)- .



- Close the return hose with a Clamp (diam. 25 mm) -3094- .
- Remove the screw.
- Close the pressure hose with plastic bag or something similar.



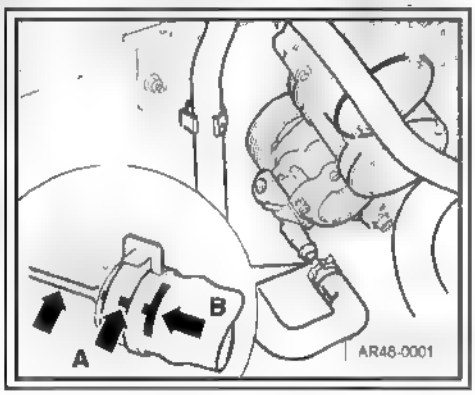
- Loosen hexagon screws -1- and -2-.
- Remove the pump



5.4.2 Installation

Install by inverting the removal sequence, paying attention to the following:

- Fill the hydraulic pump with hydraulic oil. Insert oil through pump intake nozzle.
- Manually turn the hub until oil comes out from the pressure side.
- Install the hydraulic pump on the support and tighten the screws with a torque of 23 Nm.
- Install the intake hose and the clamp. The mark -arrow A- should be aligned with the seam -arrow-. The clamp shall face the mark -arrow B-.
- Install new sealants over the hollow screw.
- Tighten the hollow screw, applying a torque of 38 Nm.



5.5 Vehicles with hydraulic pump installed on the lower part - remove and install

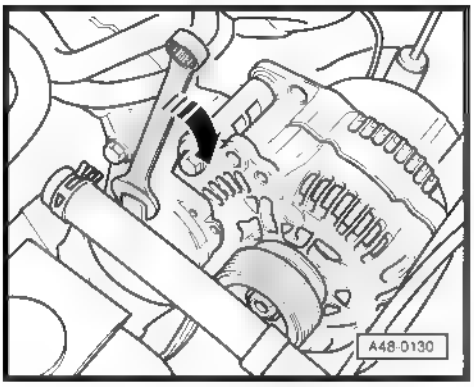
Note

- *Spare pumps are not filled with oil. Thus, before performing the installation, fill it with Hydraulic Oil -325 029 011- and turn them manually. Otherwise, noises may appear during the operation or damages to the pump*
- *Oil quantity in the system: 0,7 ... 0.9 l.*

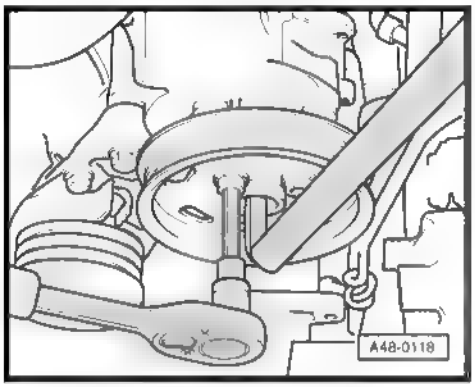
5.5.1 Removal

- Mark Poly-V belt operation direction

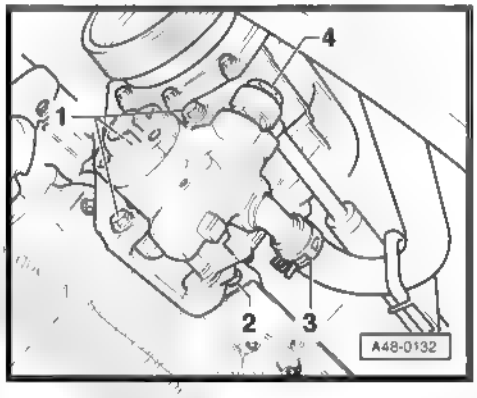
- In order to relieve the Poly-V belt, displace the tensioner towards the -arrow-
- Remove the Poly-V belt



- Loosen the screws of Poly-V belt and lock it, if necessary.
- Remove the pump pulley.



- Close the intake hose with a Clamp (diam. 25 mm) -3094- .
- Remove the intake hose, loosening the clamp -3- with Space-Saver clamp pliers -VW 5163 (VWB)- .
- Loosen the hollow screw -4-.
- Close the pressure hose with plastic bag or something similar.
- Loosen hexagon screws -1- and -2-.
- Remove the pump.

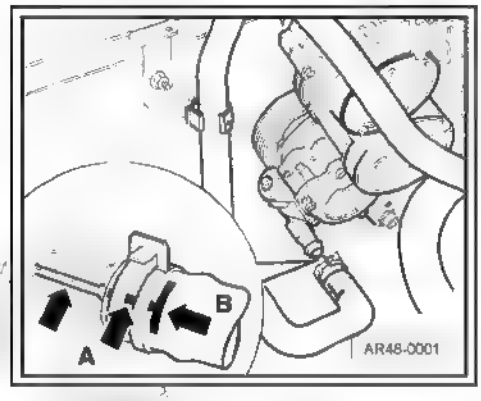


5.5.2 Installation

Install by inverting the removal sequence, paying attention to the following:

- Fill the hydraulic pump with hydraulic oil. Insert oil through pump intake nozzle.
- Manually turn the hub until oil comes out from the pressure side.
- Install the hydraulic pump on the support and tighten the screws with a torque of 23 Nm.

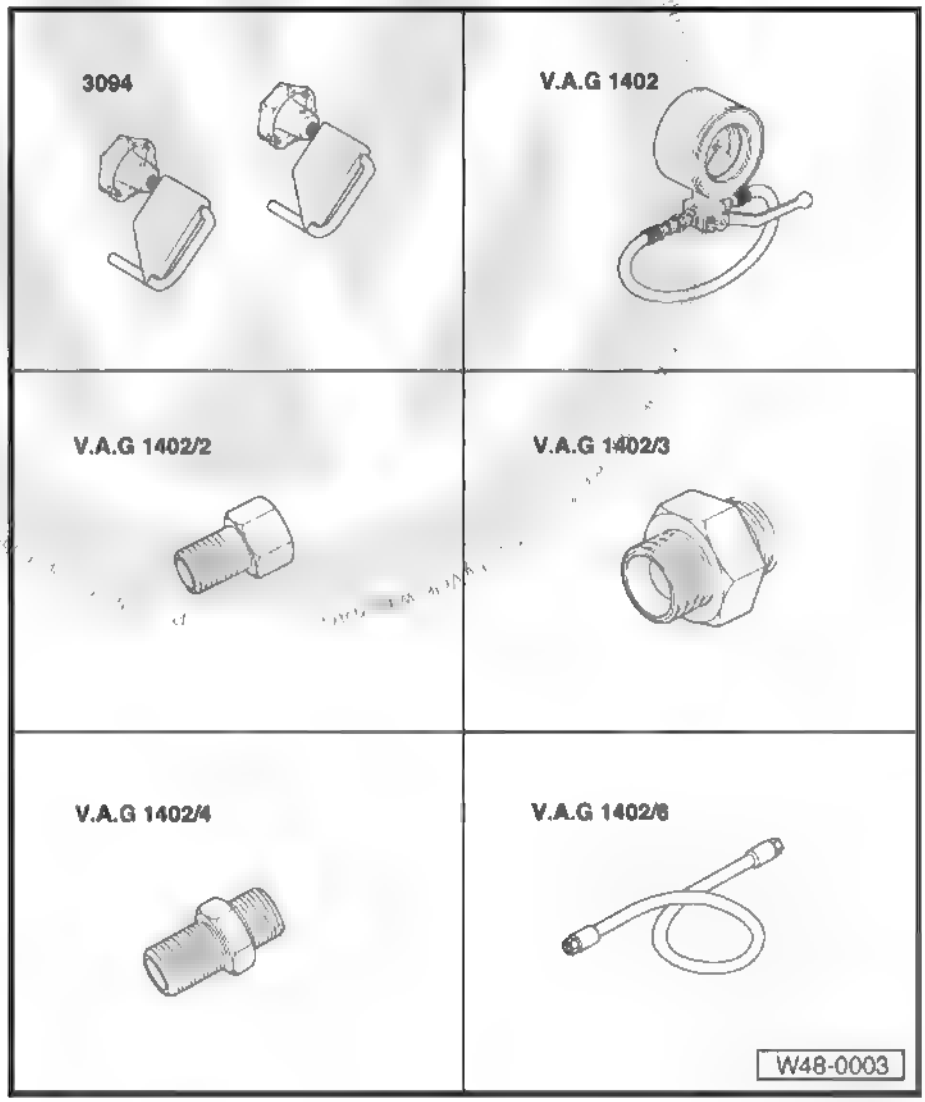
- Install the intake hose and the clamp. The mark -arrow A- should be aligned with the seam -arrow-. The clamp shall face the mark -arrow B-.
- Install new sealants on the hollow screw.
- Tighten the hollow screw, applying a torque of 38 Nm



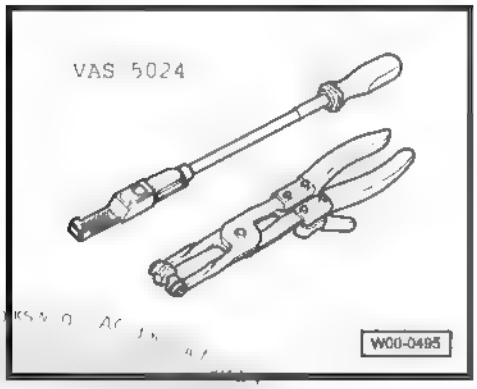
5.6 Hydraulic pump operation pressure - check

Special tools and workshop equipment required

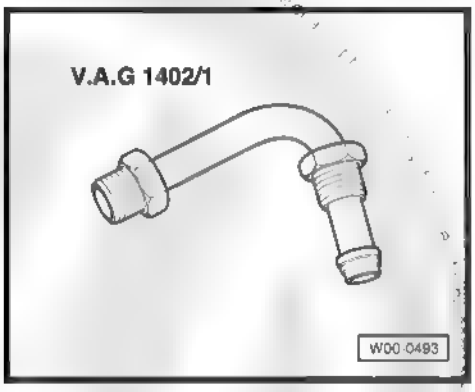
- Clamps (diam. 25 mm) -3094-
- Power steering control equipment -VAG 1402-
- Adapter -V.A.G 1402/2-
- Adapter -V.A.G 1402/3-
- Adapter -V.A.G 1402/4-
- Flexible tube of the adapter set -V.A.G 1402/6-



- Standard type clamp pliers -VAS 5024A-



- Adapter -V.A.G 1402/1-

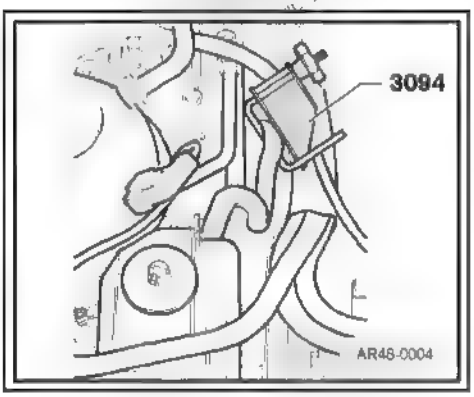


5.6.1 Vehicles with hydraulic pump on the lower part

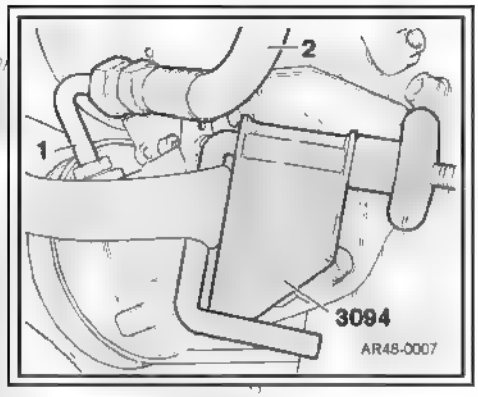
Checking conditions:

- Poly-V belt/tension are correct.
- Leak-proof hydraulic system.
- Hoses/piping not bent and/or compressed.

– Close the return hose with a Clamp (diam. 25 mm) -3094- .

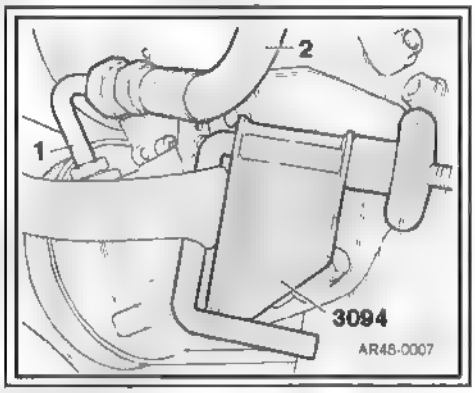


– Close the suction hose with a Clamp (diam. 25 mm) -3094-.
– Place a drip tray under the vehicle.
– Release the pump pressure tube



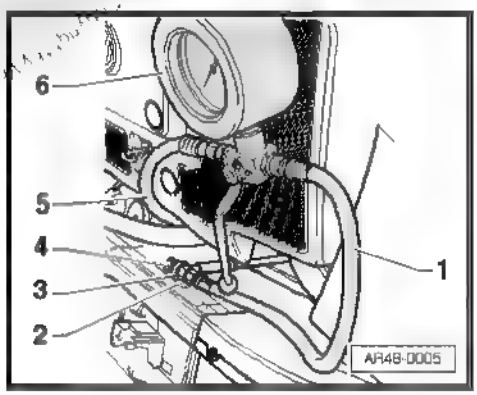
– Insert the adapter -1-. Use sealant.

1 - Adapter -V.A.G 1402/1-
2 - Flexible tube of the adapter set -V.A.G 1402/6-



– Connect the Power steering control equipment -VAG 1402- .

1 - Flexible tube of Power steering control equipment -VAG 1402-
2 - Adapter -V.A.G 1402/2-
3 - Pressure piping with ring support
4 - Hollow screw
5 - Flexible tube of the adapter set -V.A.G 1402/6-
6 - Power steering control equipment -VAG 1402-



– Remove the Clamp (diam. 25 mm) -3094- of suction and return piping.
– Start the engine and fill the compensation container up with oil if necessary.
– Turn the steering wheel approx. 10 times, from stopper to stopper.
– Close the cock (no more than 5 seconds) during engine idling and check the pressure reading

Nominal value (gasoline engines and TotalFlex): 85 to 95 bar

Note

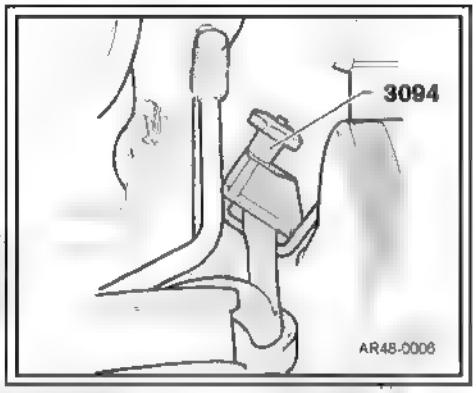
- *Replace the pump if the nominal value is not attained or surpassed.*
- *Check the steering system for leak proofness if there is lack of liquid in the container.*
- *Replace the steering box if the pinion or gear rack seal leaks.*
- *In order to check the gear rack seal, open the protection cover tube clamp and push the protection cover to the other side.*

5.6.2 Vehicles with hydraulic pump on the upper part

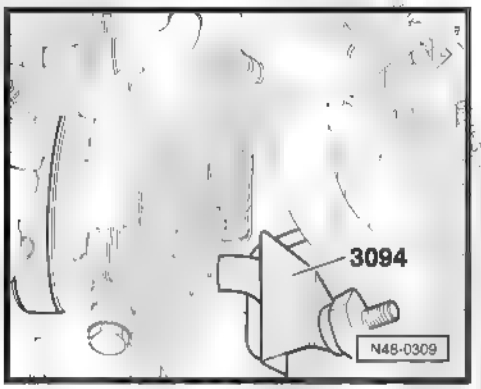
Checking conditions:

- Poly-V belt/tension are correct.
- Leak-proof hydraulic system.
- Hoses/piping not bent and/or compressed

– Close the return hose with a Clamp (diam. 25 mm) -3094- .



– Close the suction hose with a Clamp (diam. 25 mm) -3094- .
– Place a drip tray under the vehicle.
– Release the pump pressure tube.
– Connect the Power steering control equipment -VAG 1402- .



1 - Power steering control equipment -VAG 1402-

2 - Flexible tube of Power steering control equipment -VAG 1402-

3 - Flexible tube of the adapter set -V.A.G 1402/6-

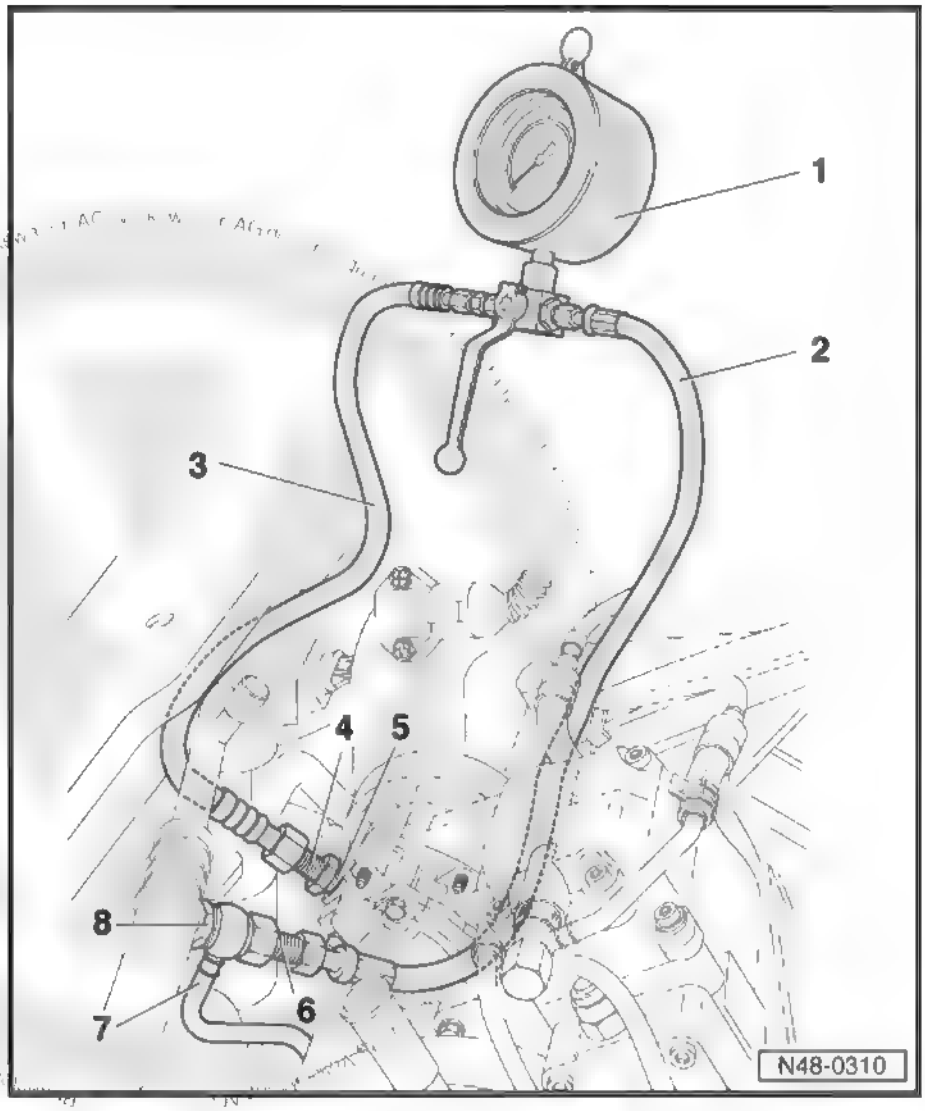
4 - Adapter -V.A.G 1402/4-

5 - Sealants
- ❑ 2 Units

6 - Adapter -V.A.G 1402/2-

7 - Pressure piping with ring support

8 - Hollow screw



– Start the engine and fill the compensation container up with oil if necessary.

– Turn the steering wheel approx. 10 times, from stopper to stopper.

– Close the cock (no more than 5 seconds) during engine idling and check the pressure reading.

Nominal value (gasoline engines and TotalFlex): 85 to 95 bar

Note

- *Replace the pump if the nominal value is not attained or surpassed.*
- *Check the steering system for leak proofness if there is lack of liquid in the container.*
- *Replace the steering box if the pinion or gear rack seal leaks.*
- *In order to check the gear rack seal, open the protection cover tube clamp and push the protection cover to the other side.*

5.7 Power steering oil - fill

Note

Using Hydraulic Oil -325 029 901 1- for power steering.

- Lift the vehicle until the front wheels are free
- Turn the steering wheel 10 times from stopper to stopper with the engine turned off
- Check hydraulic oil level and fill it up if necessary.
- Release the hydraulic oil reservoir cover.
- Run the engine for 10 seconds.
- Stop the engine.
- Check hydraulic oil level and fill it up if necessary.
- Release the hydraulic oil reservoir cover.
- Repeat the work sequence below until the hydraulic oil level no longer lowers.
- Start the engine.
- Turn the steering wheel 10 times from stopper to stopper.
- Stop the engine.
- Check hydraulic oil level and fill it up if necessary.
- After finishing the procedure, tighten reservoir cover.

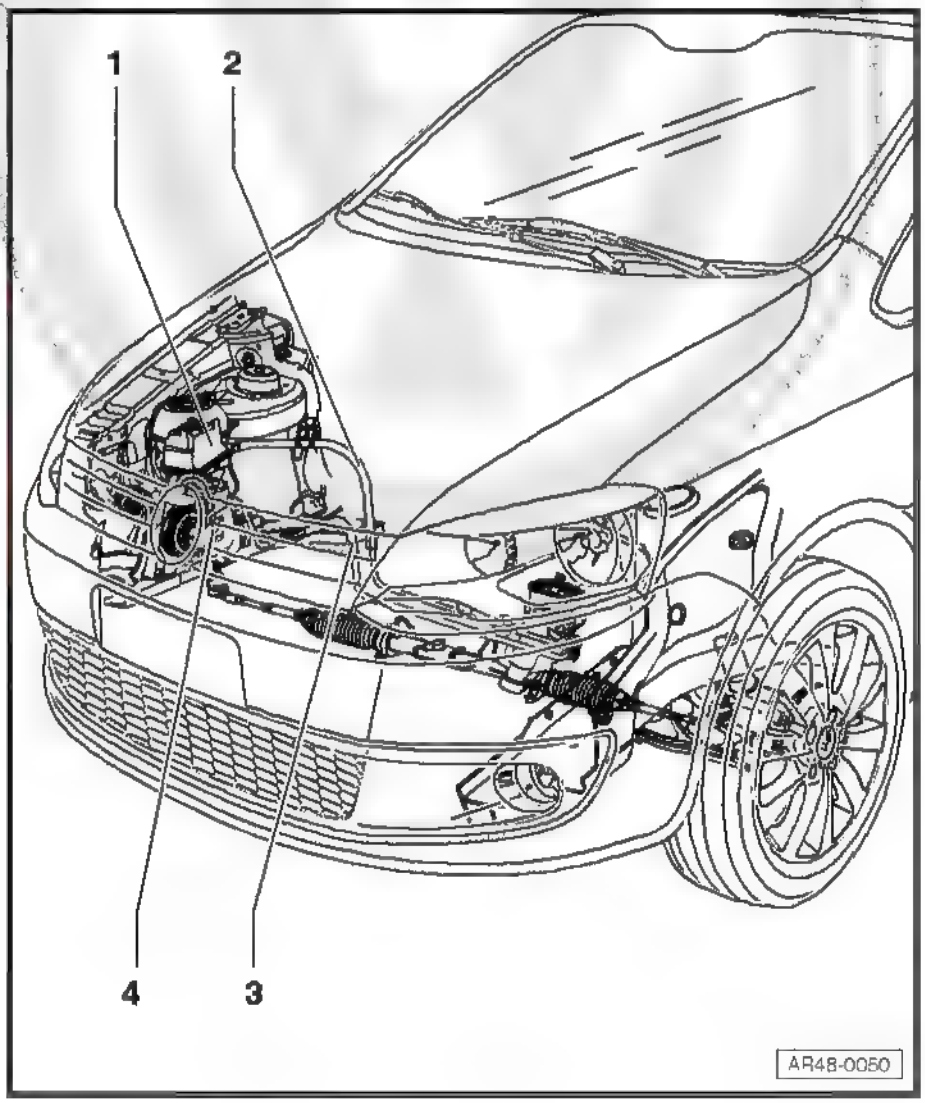
6 Hydraulic pump (power steering) - repair (valid for CCRA and CFZA engines)

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

6.1 Hydraulic pump with hydraulic piping and hoses - assembly overview

1 - Compensation reservoir
2 - Return piping
3 - Pressure piping
4 - Hydraulic pump
- ❑ Operating pressure - check ⇒ page 148
- ❑ Remove and install ⇒ page 144



6.1.1 Compensation reservoir - assembly overview

1 - Reservoir cover with measuring rod
- ❑ Oil level between the "min." and "max." marks; engine temperature approx 50 °C
- ❑ Arrow A: oil level when the engine is cold
- ❑ With engine cold, oil level cannot exceed the min. marking
- ❑ Check the oil level with reservoir cover installed

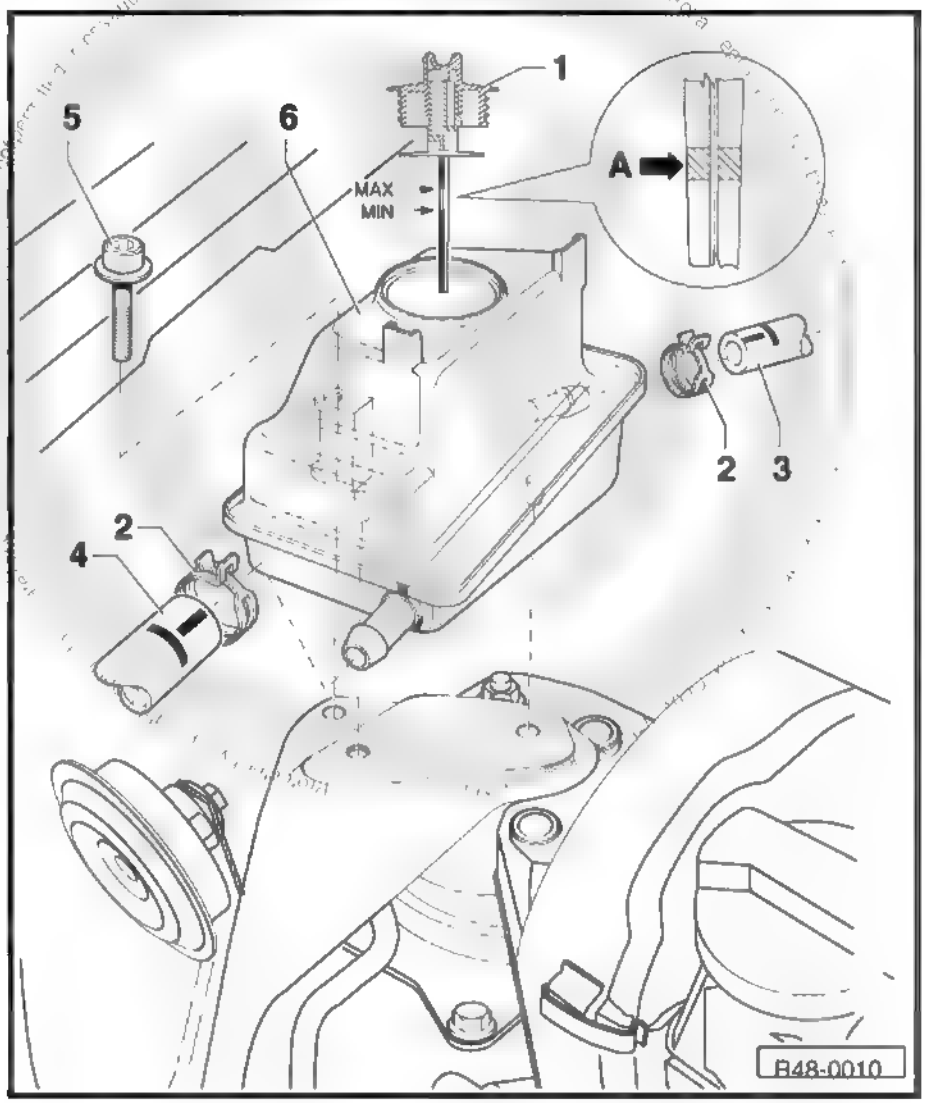
2 - Clamp

3 - Flexible return tube

4 - Flexible suction tube

5 - Internal hex head screw
- ❑ 10 Nm

6 - Compensation reservoir



6.2 Hydraulic pump - assembly overview

1 - Sealant

2 - Hollow screws
- ❑ 38 ± 4 Nm

3 - Pressure piping (outlet)

4 - Screw
- ❑ 20 Nm

5 - Hydraulic pump
- ❑ Operating pressure - check ⇒ page 148
- ❑ Remove and install ⇒ page 144

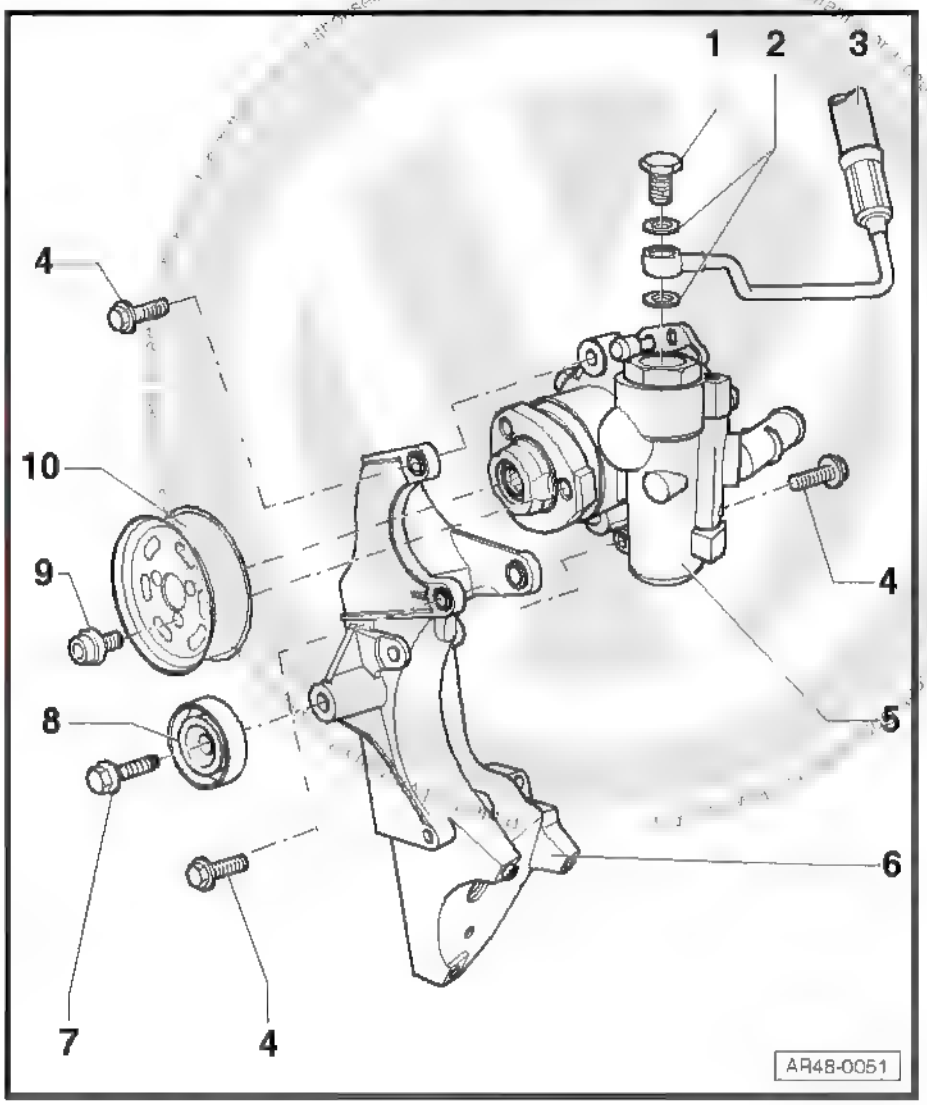
6 - Support

7 - Screw
- ❑ 45 ± 4.5 Nm

8 - Return pulley

9 - Screw
- ❑ 20 Nm

10 - Power pump driving pulley



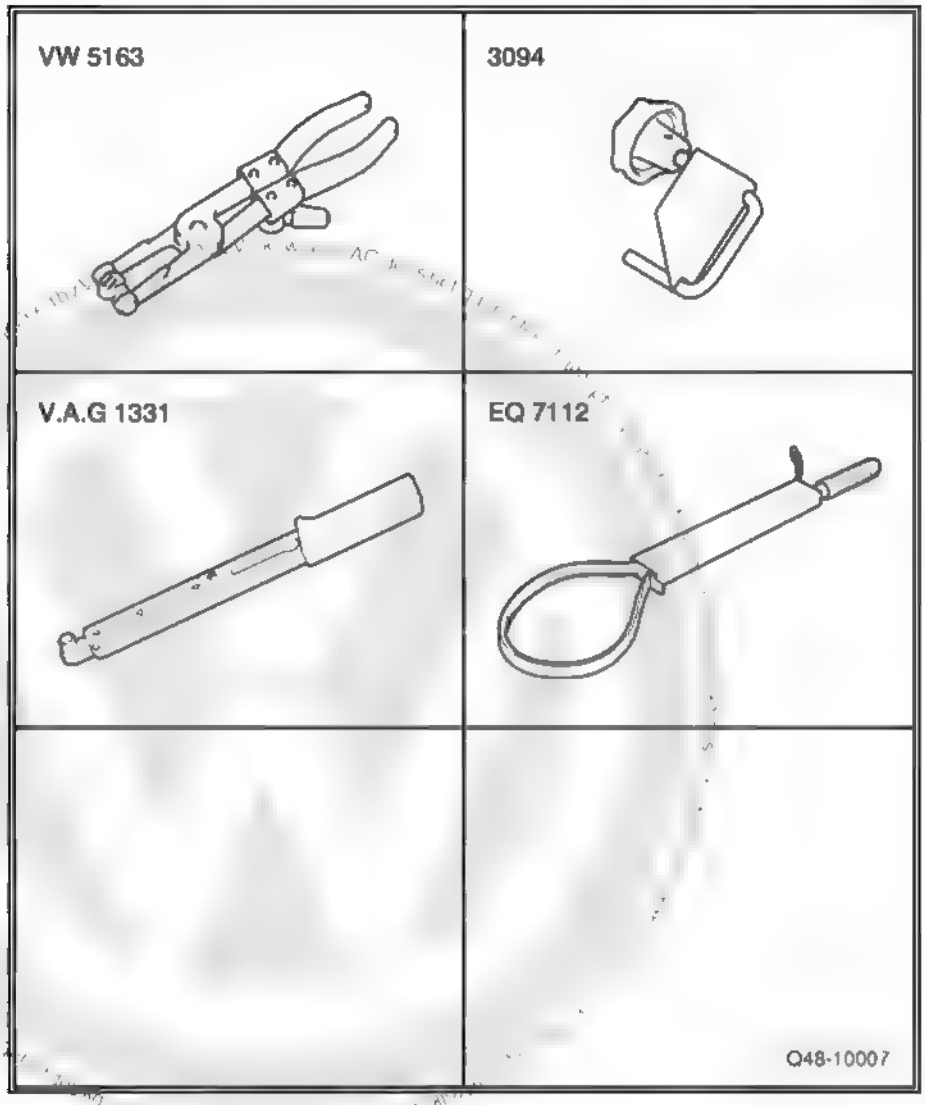
6.3 Power pump - remove and install

WARNING

Repair works in the hydraulic pump are not expected.

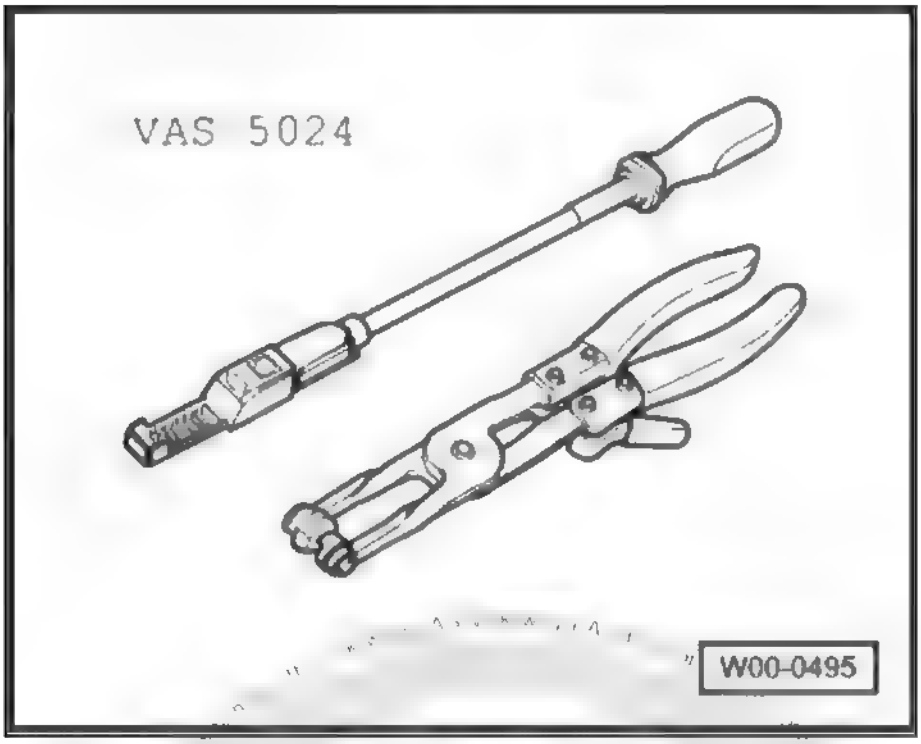
Special tools and workshop equipment required

- Clamp pliers -VW 5163-
- Clamp (diam. 25 mm) -3094-
- Rod for blocking Poly-V pulleys -EQ -7112-
- Torque wrench - 5 to 50 Nm -VAG 1331-



or

- Pliers or Hazet 790-1 -VW 5024-

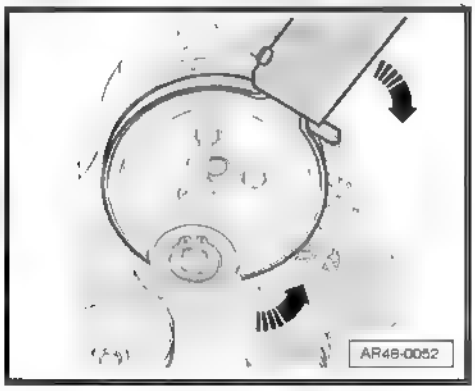


Note

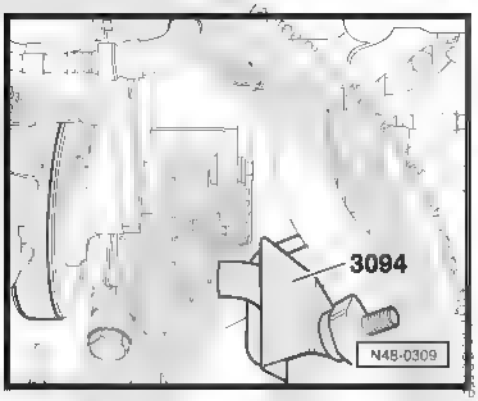
- *The replacement pumps are not supplied with oil. Thus, before performing the installation, fill it with Hydraulic Oil -325 029 901 1- and turn them manually. Otherwise, noises may appear during the operation or damages to the pump.*
- *Oil quantity in the system: 0,7 ....0.9l.*

6.3.1 Removal

- Remove the noise insulation.⇒ Body - external mountings; Rep. Gr. 50 .
- Remove the Poly-V belt (elastic) ⇒ Engine; Rep. Gr. 13 .
- Using the Rod for blocking Poly-V pulleys -EQ-7112- to attach the pulley, loosen the Poly-V belt pulley screws (with inner hexagon portion).
- Remove the internal hex head screw from the Poly-V belt pulley.
- Remove the pump pulley.
- Remove the pump intake hose.

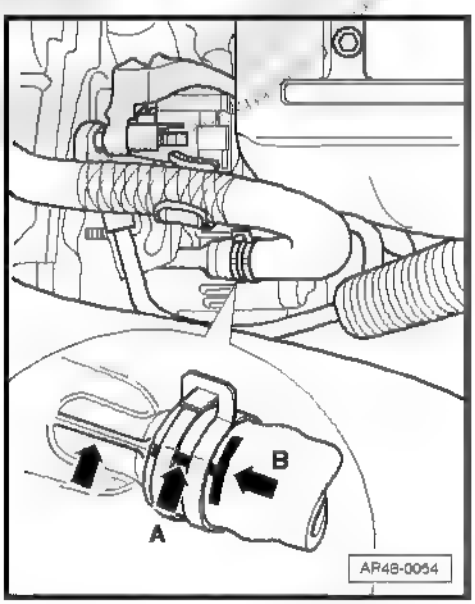


- Restrain the suction hose (inlet) with a Clamp (diam. 25 mm) -3094- .
- Using the Clamp pliers -VW 5163- , open the clamp and loosen the suction hose (inlet).
- Restrain the return hose (outlet) with a Clamp (diam. 25 mm) -3094- .
- Remove hollow screw.
- Close the pressure tubes with a plastic bag or similar object



6.3.2 Installation

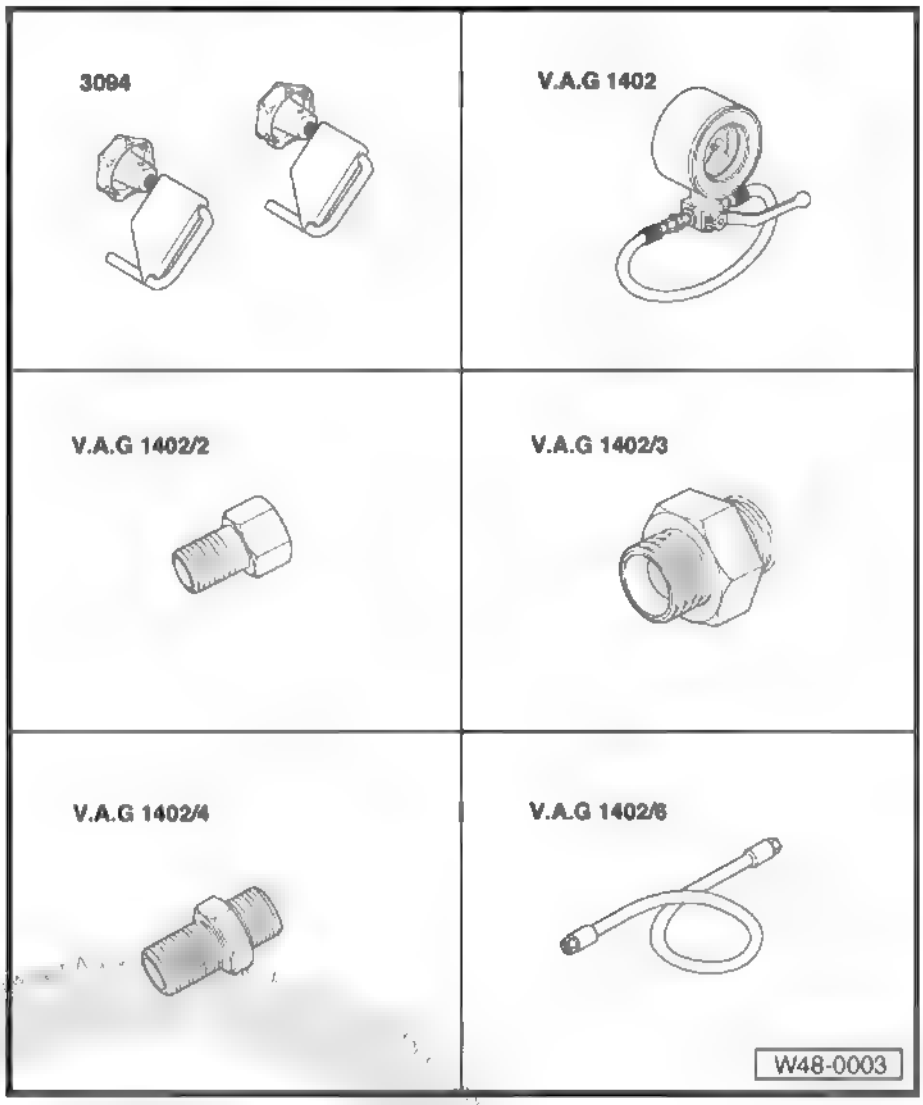
- Fill the hydraulic pump with hydraulic oil, inserting through the pump intake nozzle.
- Manually turn the hub until oil comes out from the pressure side.
- Install the hydraulic pump on the support and tighten the screws. Tightening torque ⇒ Item 4 (page 144) .
- Insert the intake tube and install the clamp. The mark -arrow A- should be aligned with the arrow seam. The clamp should be perpendicular to the mark -arrow B-.
- Install new sealants on the hollow screw.
- Tighten the hollow screw. Tightening torque ⇒ Item 2 (page 144) .
- The remaining installation steps are carried out in reverse order of removal.



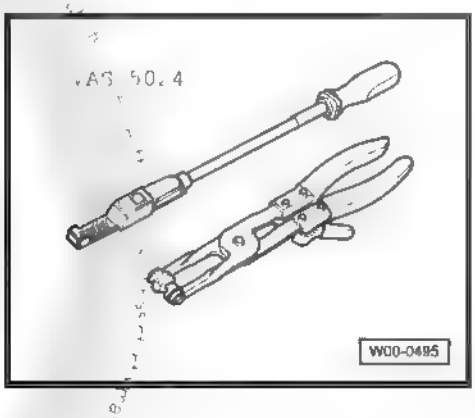
6.4 Hydraulic pump operation pressure - check

Special tools and workshop equipment required

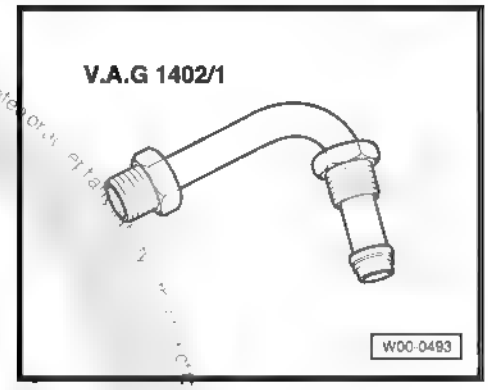
- Clamps (diam. 25 mm) -3094-
- Power steering control equipment -VAG 1402-
- Adapter -V.A.G 1402/2-
- Adapter -V.A.G 1402/3-
- Adapter -V.A.G 1402/4-
- Flexible tube of the ?? adapter set -V.A.G 1402/6-



- Standard type clamp pliers -VAS 5024A-

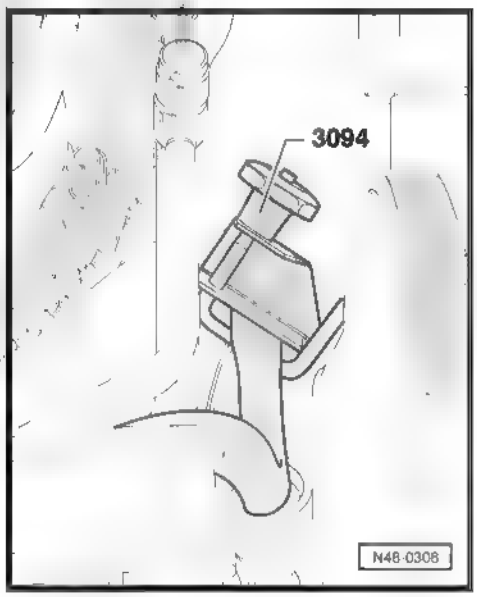


♦ Adapter -V.A.G 1402/1-



6.4.1 Checking procedure

– Restrain the return piping (outlet) with a Clamp (diam. 25 mm) -3094-.
– Restrain the suction hose (inlet) with a Clamp (diam. 25 mm) -3094-.
– Place oil drip pan underneath vehicle.
– Release the pump pressure tube screw.



6.4.2 Connect control device for power steering - VAG 1402-

1 - Control device for power steering - VAG 1402-

2 - Control device flexible tube for power steering - VAG 1402-

3 - Adapter - VAG 1402/6-

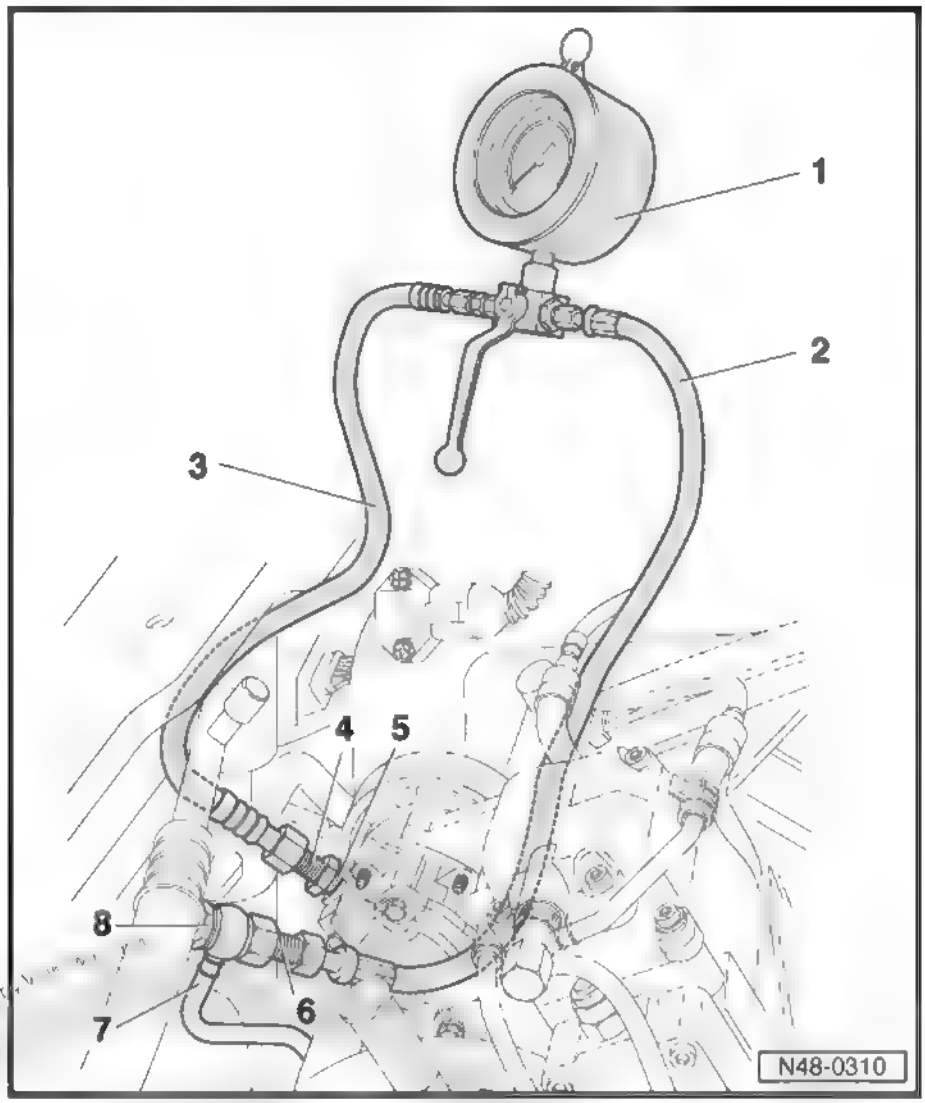
4 - Adapter - V.A.G 1402/4-

5 - Sealants
- ❑ 2 Units

6 - Adapter - V.A.G 1402/2-

7 - Pressure piping with ring support

8 - Hollow screw



– Remove Clamps (diam. 25 mm) -3094- of suction and return piping.

– Start engine and, if needed, fill fluid level from compensation container.

– Turn the steering wheel approx. 10 times, from stopper to stopper.

– Check operating pressure.

6.4.3 Checking conditions:

- Poly-V belt (elastic)/tightening of poly-V belt (elastic) in order
- Correct system sealing
- Flexible tubes/tubing unbent/unclipped
- Close cutoff valve (not longer than 5 seconds) during engine idling and read pressure.

Nominal value: 85 ... 95 bar

Note

- *Replace the pump if the nominal value is not attained or surpassed.*
- *Check the steering system for leak proofness if there is lack of liquid in the container.*
- *Check tubings/connections for leaks; close and dry, if needed.*
- *Replace steering box if pinion or cogwheel sealing leaks*
- *In order to check the gear rack seal, open the protection cover tube clamp and push the protection cover to the other side.*

6.5 Power steering oil - fill

Note

Using Hydraulic Oil -325 029 901 1- for power steering.

- Lift the vehicle until the front wheels are free.
- Check hydraulic oil level and fill it up if necessary.
- Release the hydraulic oil reservoir cover.
- Run the engine for 10 seconds.
- Stop the engine.
- Check hydraulic oil level and fill it up to the level, if necessary.
- Release the hydraulic oil reservoir cover.

Repeat the work sequence below until the hydraulic oil level no longer lowers:

- Start the engine.
- Turn the steering wheel 10 times from stopper to stopper.
- Stop the engine.
- After finishing the procedure, tighten reservoir cover.

7 Hydraulic power steering (Diesel engines) - repair

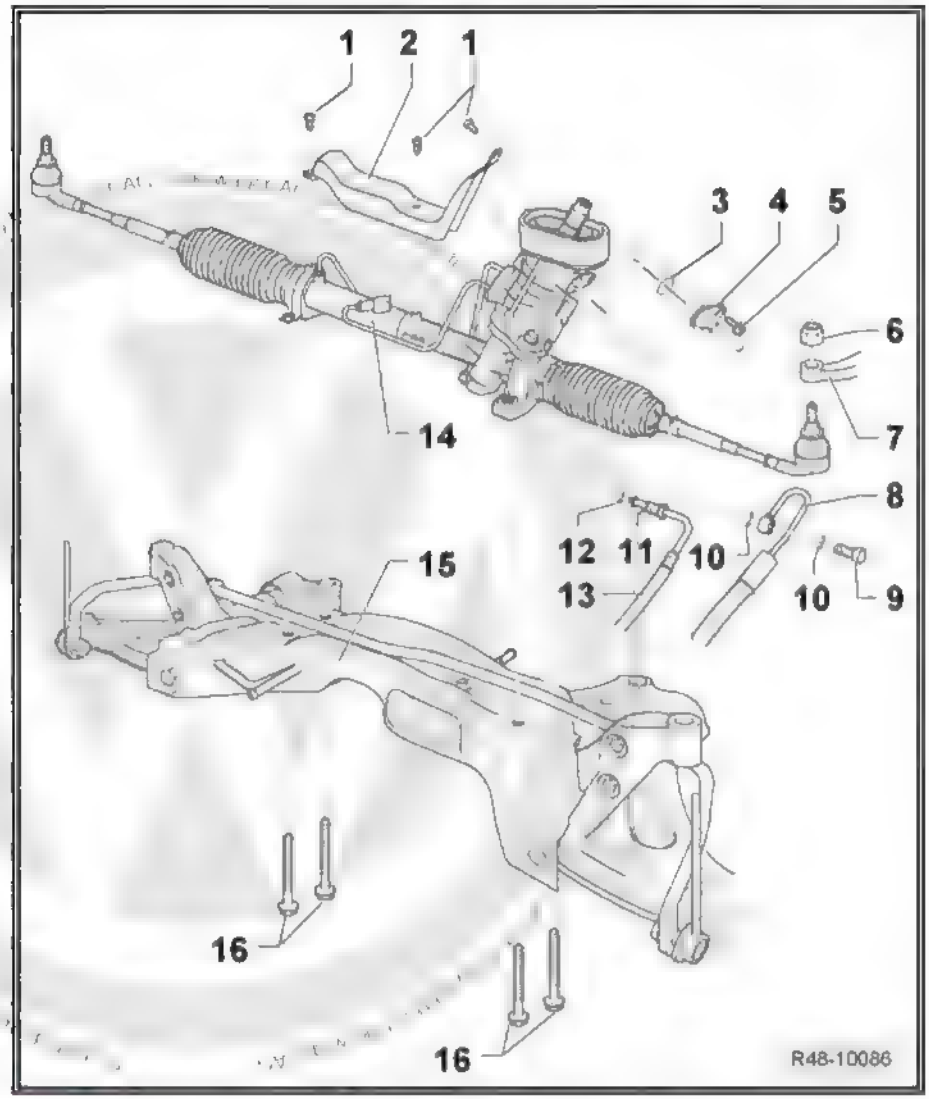
WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

7.1 Hydraulic power steering from JTEKT - assembly overview

Note

- *Repairing the steering box is not allowed. In case of complaints, replace the entire steering box.*
- *To lubricate the rack, use only Grease for steering gear housing -AOF 063 000 04-*
- *Replace self-locking nuts and screws*
- *Type of oil: Hydraulic oil -G 004 000 M2-*
- *Oil filling capacity on the system: approx. 0.8 liters*



1 - Screw
- ❑ 8 Nm

2 - Heat shield

3 - Gasket

4 - Electro-hydraulic power steering sensor -G250-
- ❑ Remove and install ⇒ page 161
- ❑ Check "Assisted Troubleshooting" with Diagnosis, Measurement and Information System -VAS 5051A/52-

5 - Screw
- ❑ 6 Nm

6 - Hexagon nut
- ❑ 20 Nm + 90°
- ❑ replace after each removal

7 - Steering arm

8 - Pressure hose

9 - Hollow screw
- ❑ 40 Nm

10 - Gasket

11 - Connecting screw
- ❑ 30 Nm

12 - ?Sealant

13 - Return hose

14 - Steering box
- ❑ Remove and install ⇒ page 155

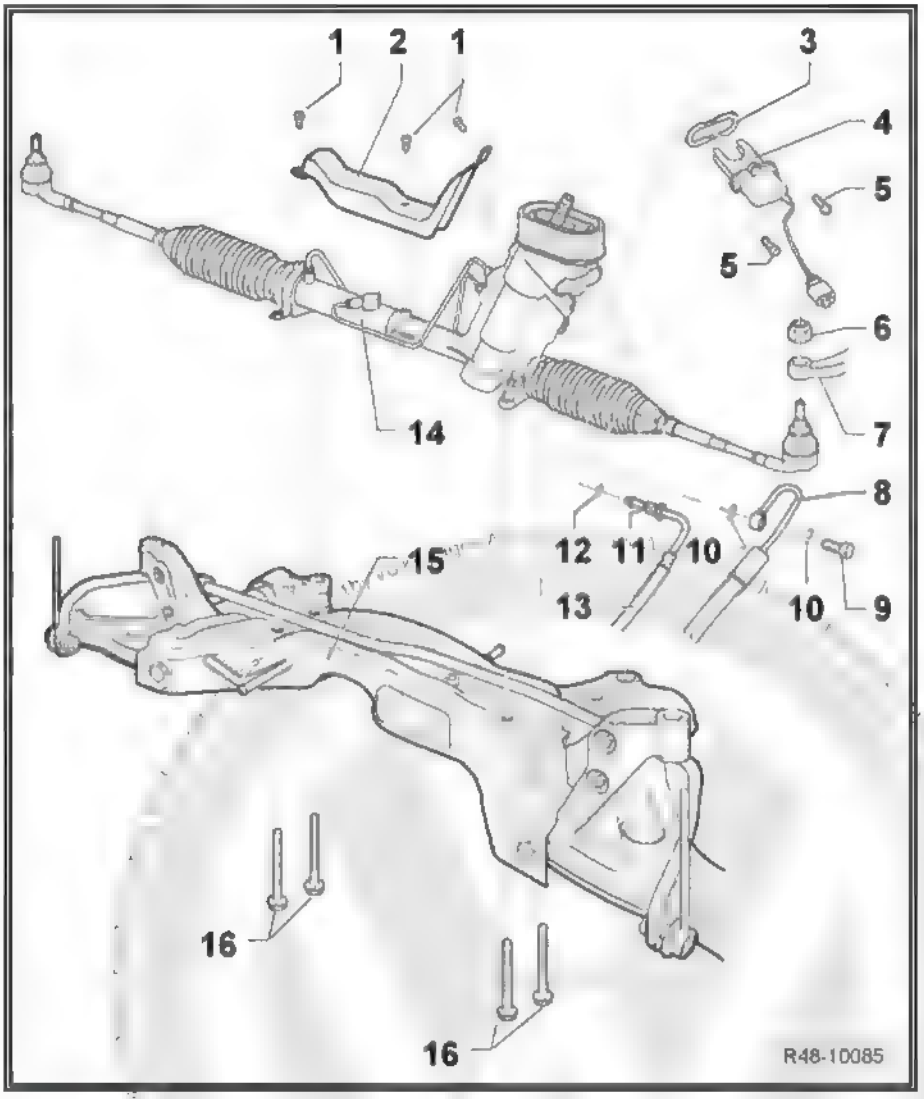
15 - Subframe
- ❑ Check the repair notes ⇒ page 7

16 - Hexagon screw
- ❑ 50 Nm + 90°
- ❑ replace after each removal

7.2 Hydraulic power steering f⁸ TRW - assembly overview

Note

- *It is not permitted to repair the steering box. In case of complaints, replace the entire steering box*
- *To lubricate the rack, use only Grease for steering gear housing -AOF 063 000 04-*
- *Replace self-locking nuts and screws*
- *Type of oil: Hydraulic oil -G 004 000 M2-*
- *Oil filling capacity on the system: approx. 0.8 liters*



1 - Screw
- ❑ 8 Nm

2 - Heat shield

3 - Gasket

4 - Electro-hydraulic power steering sensor -G250-
- ❑ remove and install ⇒ page 161
- ❑ it can be checked in the function "Assisted Troubleshooting" with Diagnosis, Measurement and Information System -VAS 5051A/52-

5 - Screw
- ❑ 6 Nm

6 - Hexagon nut
- ❑ 20 Nm + 90°
- ❑ replace after each removal

7 - Steering arm

8 - Pressure hose

9 - Hollow screw
- ❑ 40 Nm

10 - Gasket

11 - Connecting screw
- ❑ 30 Nm

12 - Sealant

13 - Return hose

14 - Steering box
- ❑ remove and install ➢ page 155

15 - Subframe
- ❑ Observe the notes on repair work ➢ page 7

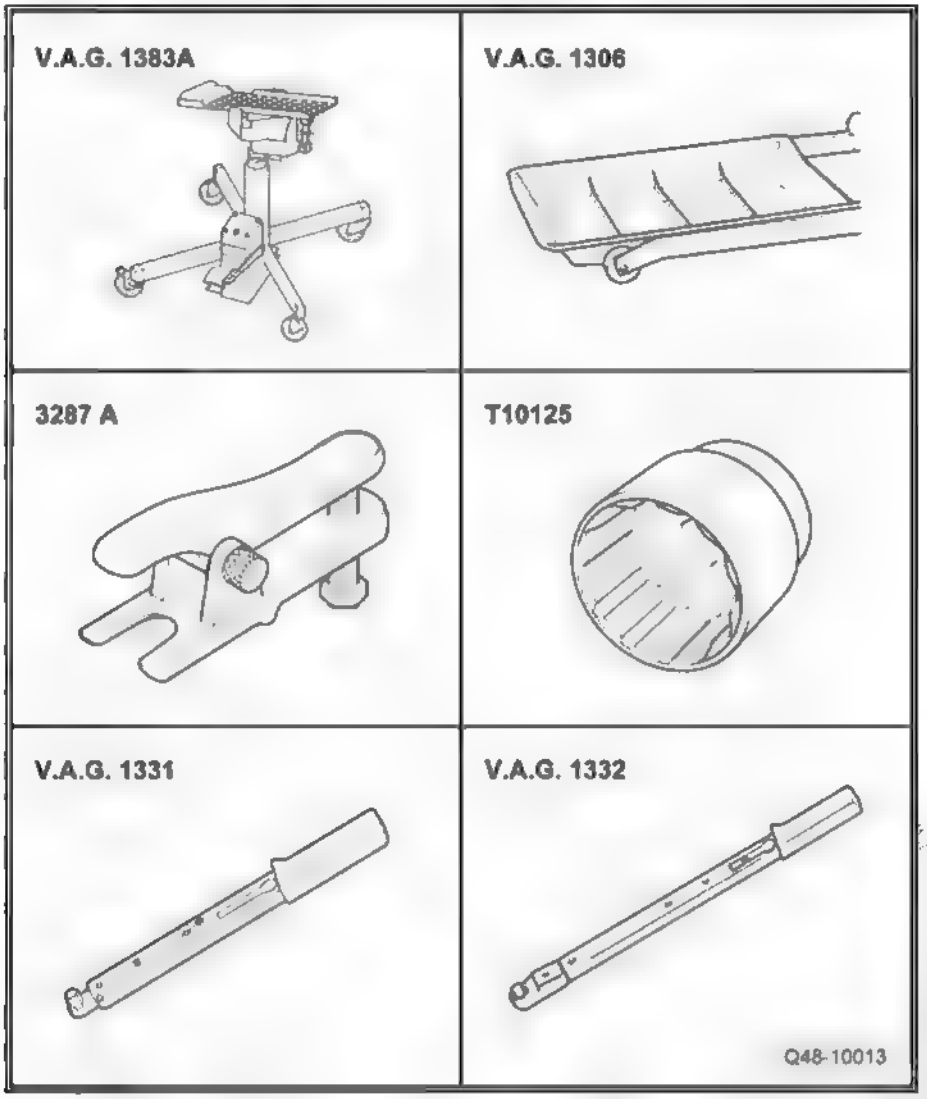
16 - Hexagon screw
- ❑ 50 Nm + 90°

❑ replace after each removal

7.3 Electro-hydraulic power steering gear housing - remove and install

Special tools and workshop equipment required

- Engine and gearbox jack + gearbox or EQ 7081 -VAG 1383A- and Tray for engine jack EQ 7081 -VAG 1359/2-
- Drip tray -VAG 1306-
- Extractor -3287 A-
- Star socket 36mm or Gedore Ref. D32-36 -T 10125-
- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-

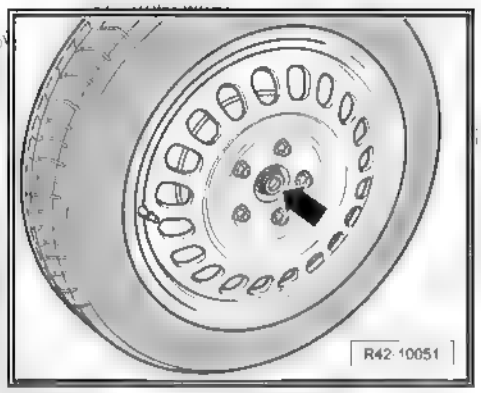


7.3.1 Instructions for working with the hydraulic power steering box

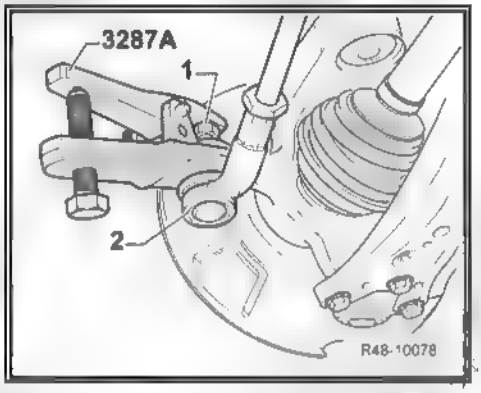
- Absolute cleaning is mandatory when working with hydraulic power steering
- Completely clean the connections and surrounding areas before disconnecting any component
- Parts removed must be placed on a clean and covered surface, if the repair is not performed immediately
- Do not use cloths with lints
- Only unpack the replacement parts immediately before installing them
- Use only original parts

7.3.2 Removal

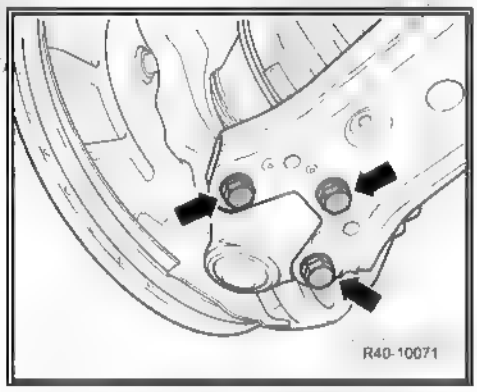
- Disconnect the Battery -A- . Please refer to manual ⇒ Electrical equipment; Rep Gr. 27 ; Starter, alternator, battery .
- Remove the Battery -A- and its console. Please refer to manual ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .
- Lift the vehicle until the front axle is without any load.
- Loosen the grooved nut -arrow- with the ?Star socket 36mm or Gedore Ref D32-36 -T 10125- or the 30-mm star socket.
- Remove the wheel.



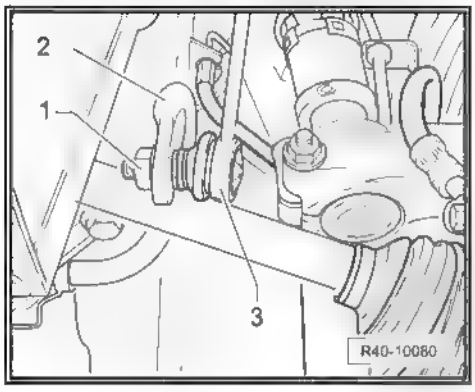
- Loosen the fastening nut -1- from the yoke.
- Separate the steering yoke tip -2- from the wheel roller bearing case, by using the Extractor -3287 A- .
- Mark the position for the swivel tip screws on the wishbone.



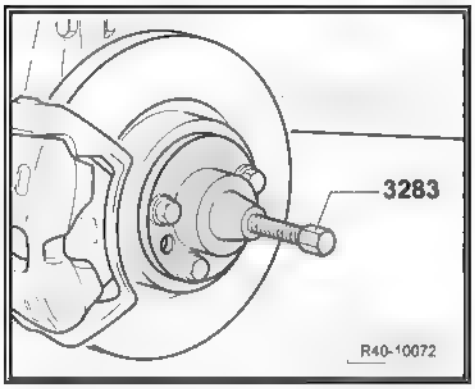
- Remove the attaching screws -arrows-.
- Move the suspension column together with the swivel joint on the wishbone.



- Remove the hexagon nuts -1- from both sides of the coupling rod -3-.
- Remove the coupling rod -3- from the anti-roll bar -2-.



– Press the drive axle shaft out of the roller bearing case. To do this, install the Extractor -3283- as shown in the illustration.



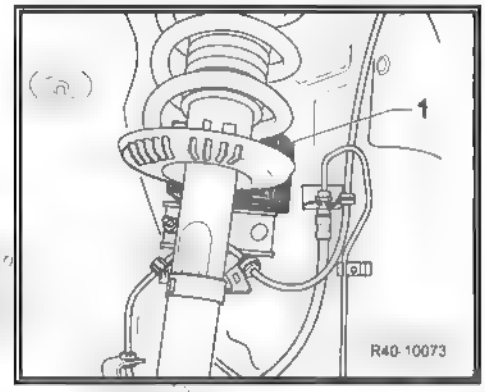
Note

While pressing the drive axle shaft outwards, make sure you have enough free space.

– Remove the wheel roller bearing case with the shaft articulation out of the transverse arm

– Turn the suspension outward and support, for example, with a wooden block -1- , and simultaneously remove the drive axle shaft from the wheel roller bearing.

– Fasten the drive axle shaft to the body with a wire.



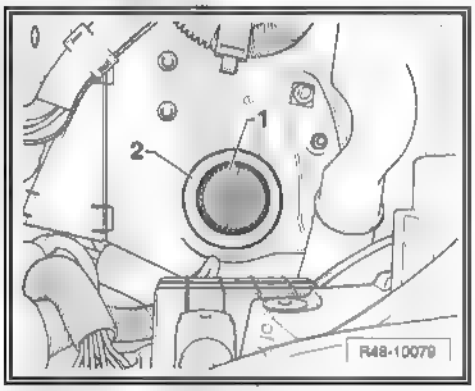
Note

The drive axle shaft must not be pressed downwards. Otherwise, the internal articulation will be damaged due to excessive tilting.

The drive shaft should not be left hanging, as it may be damaged in case of excessive inclination.

– Remove cover -1- from engine/pump assembly -2-.

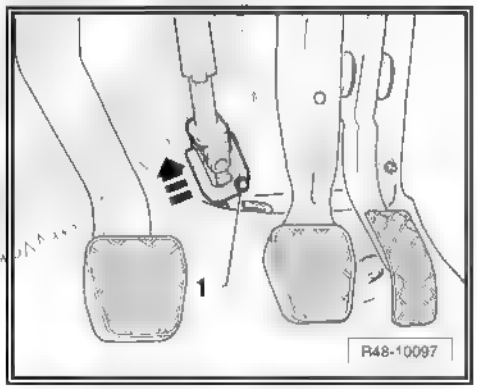
– Remove as much hydraulic oil from the pump as possible, with the help of a suction bottle.



– Remove the screw -1- from the universal joint and uncouple in the arrow direction.

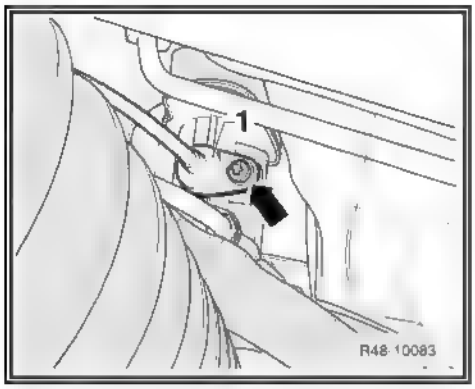
Vehicles with hydraulic power steering f³ JTEKT.

– Remove the screw -arrow-.



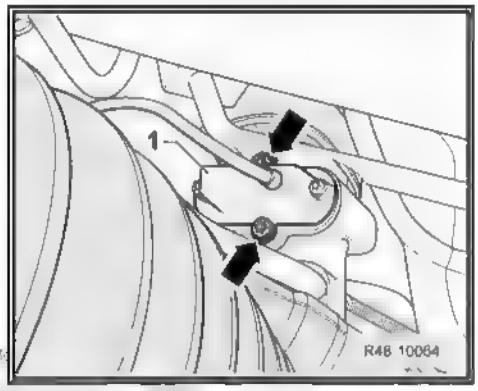
– Remove the Electro-hydraulic power steering sensor -G250- -1- from the steering box.

Vehicles with hydraulic power steering f⁸ TRW.

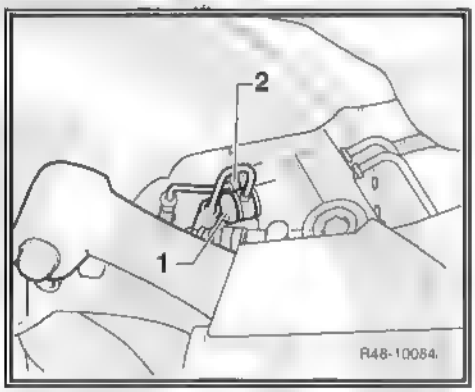


– Remove screws -arrows-.
– Remove the Electro-hydraulic power steering sensor -G250- -1- from the steering box.

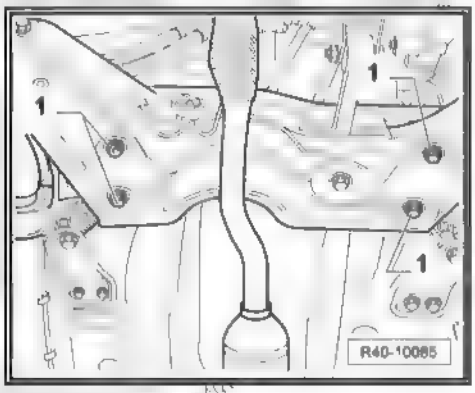
Continuation for all vehicles.



– Remove the hollow screw of the pressure duct -1- (19-mm wrench measurement) of steering gear housing.
– Remove the connecting screw of the return duct -2- (17 mm wrench measurement) of steering gear housing.
– Seal the ducts with the help of a plastic bag and adhesive tape.
– Seal the electro-hydraulic power steering box threaded holes with plastic seal plugs.



– Remove screws -1- from the steering box fastened to the sub-frame.
– Position the subframe ⇒ page 20 .
– Remove the electro-hydraulic power steering gear housing.



7.3.3 Installation

WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

Note

- *Use new sealants for the hoses/ducts*
- *Coat steering box seals with lubricant, e.g soft soap, before installing steering box*
- *After fitting the steering box in the universal joint of the column, make sure that the joint is against the assembly plate, without twisting, and that it seals the opening for the pedal area correctly. There may be noises and even water infiltration*
- *Make sure that the sealing surfaces are clean*
- *When replacing the hydraulic power steering box, also replace the steering yoke cauls*

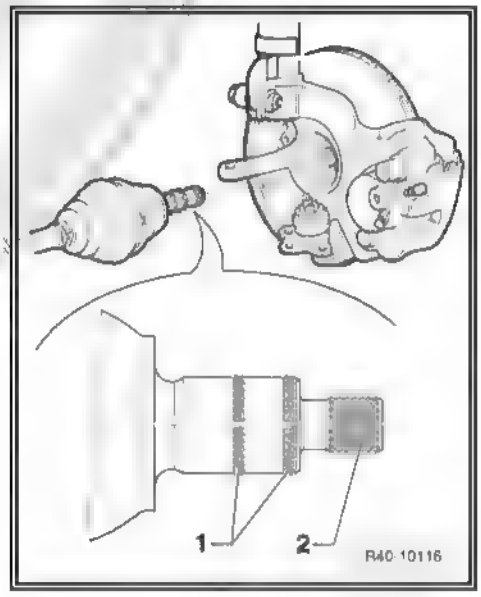
Before installing the subframe screws, position the hydraulic power steering box on the subframe and install the screws for the hydraulic power steering box.

– Fasten the subframe ⇒ page 20 .

Only for vehicles without ABS

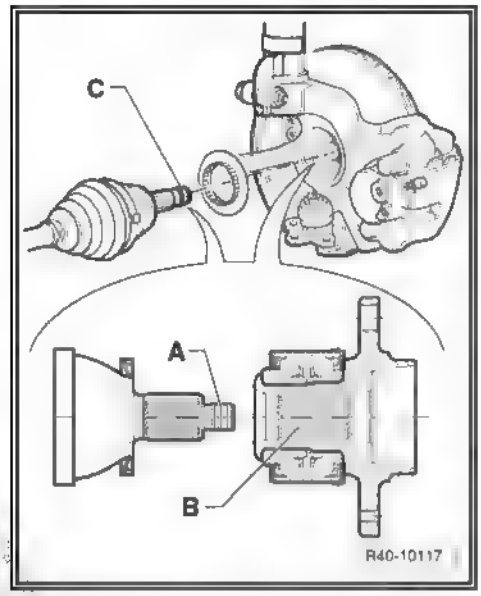
– Clean threaded and indented surfaces.
– Lubricate the toothed area -1- and the thread -2- with Molybdenum Paste -G 052 751 A1- . See the ⇒ Chemical material manual .

Only for vehicles with 13" running gear with ABS/ESP



Install the articulated shaft on the wheel bearing as follows

- Apply the Adhesive -D 185 400 A2- to the stub axle threads -A- or to the nut thread. See the ⇒ Chemical material manual .
- Apply 2g of Adhesive -D 185 400 A2- to area -B-. Refer to the ⇒ Chemical material manual .
- The areas where the Adhesive -D 185 400 A2- should be free from grease, oil, water or any other type of material. See the ⇒ Chemical material manual .
- Tighten the nut with 50 Nm.



WARNING

The torque must be applied within 2 minutes after inserting the shaft tip into the wheel hub. After the torque process, the vehicle must remain at least 1.5 hours with no strain on the semi-shaft (only parking operations allowed).

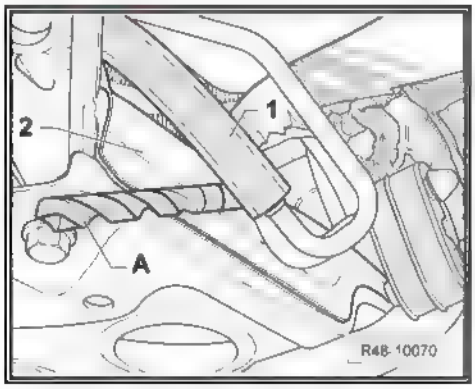
Continuation for all vehicles:

- Fasten the swivel tip to the wishbone (screws on old marks). Tightening torque ⇒ Item 17 (page 8) .

Note

Check if the protective bellows are not damaged or twisted

- Fasten the steering box to the subframe ⇒ Item 16 (page 153) .
- Bolt track rod ball joint to steering arm ⇒ Item 6 (page 153) .
- Install the Electro-hydraulic power steering sensor -G250- to the steering gear housing, and tighten it ⇒ Item 5 (page 153) .
- Install the return hose and tighten the connection screw (key measurement 17 mm) ⇒ Item 11 (page 153) .

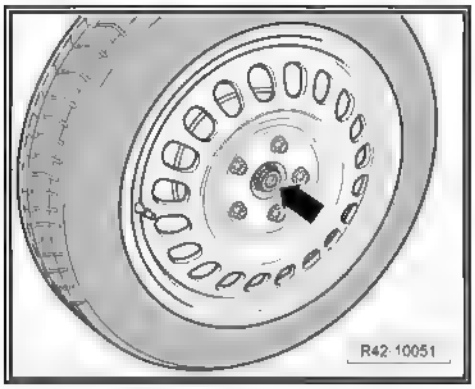


- If the pressure duct extends beyond the subframe, the distance between the pressure duct and the subframe must be adjusted.
- The distance between the pressure duct -1- and the subframe -2- should be 10 mm.
- To perform this operation, use a 10 mm drill bit -A- between the pressure duct -1- and the subframe -2-.
- Then, tighten the pressure duct hollow screw ⇒ Item 9 (page 153) .

Note

Make sure that the pressure duct does not interfere on the body and the subframe

- Install the wheels and tighten the screws ➢ page 88 .



– Tighten the splined nut -arrow -.
– Fill with new hydraulic oil, using a hose with 400 to 500 mm of length and a funnel.

Use Hydraulic Oil -G 004 000 M2- . Refer to the ⇒ Chemical material manual

– Install the universal joint on steering box pinion.
– Install the hex head screw from below and tighten it ⇒ Item 5 (page 154) .
– Install Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .
– Connect the Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .
– Bleed steering system ⇒ page 177 .
– Check hydraulic oil level ⇒ page 179 .

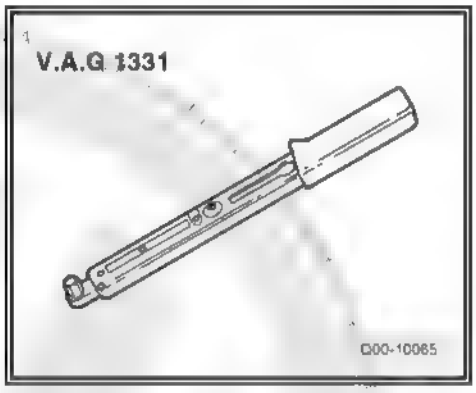
• After the installation, you must check the steering wheel position through a test drive.
• If the steering wheel is not in straight ahead position, the front axle alignment must be checked and if necessary adjusted.

– Check alignment ⇒ page 89 .

7.4 Electro-hydraulic power steering sensor -G250- - remove and install

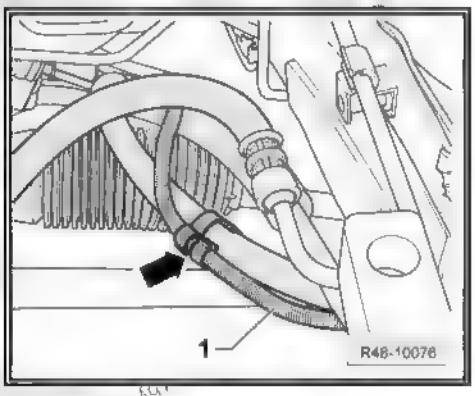
Special tools and workshop equipment required

♦ "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-

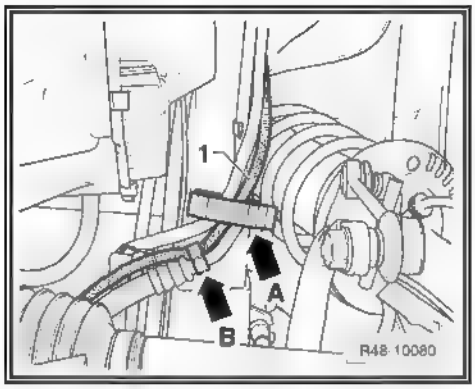


7.4.1 Removal

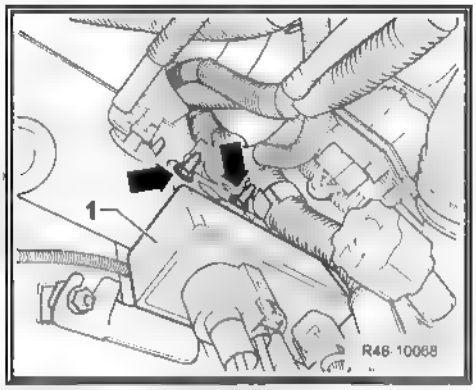
– Remove the cable -1- of Electro-hydraulic power steering sensor -G250- from supports -arrow-.
– Remove the left front wheel.
– Remove front left wheel housing liner ⇒ Body - external mountings; Rep. Gr. 66 ; External equipment .



– Open spacer -arrow A-.
– Remove the cable -1- of Electro-hydraulic power steering sensor -G250- from supports -arrow B-.

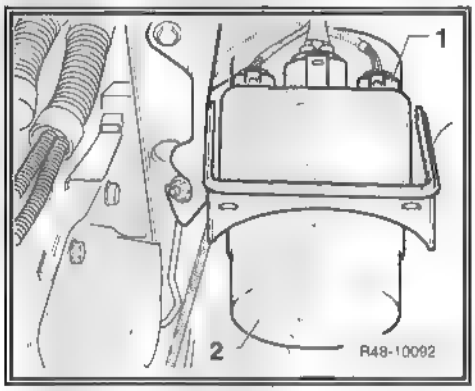


– Remove radiator vent control unit -1- of sill -arrows-.



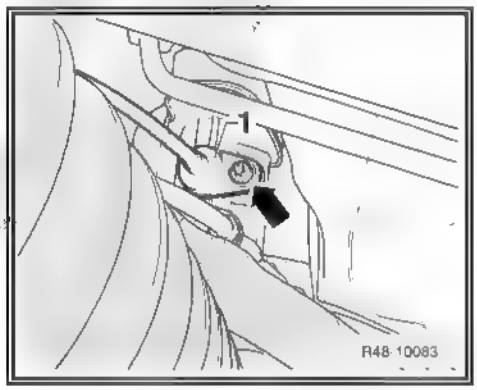
– Pull off connector -1- from engine/pump assembly -2-.

Vehicles with hydraulic power steering f³ JTEKT:

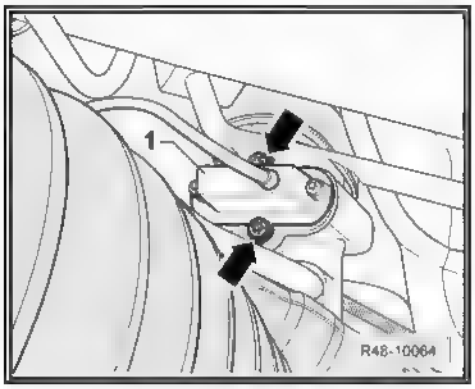


– Remove the screw -arrow-.
– Remove the Electro-hydraulic power steering sensor -G250- -1- from steering gear housing.

Vehicles with hydraulic power steering f³ TRW:

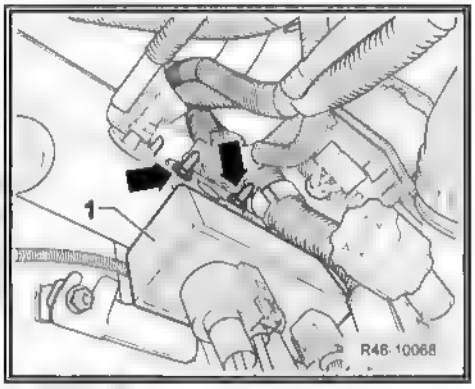


- Remove screws -arrows-.
- Remove the Electro-hydraulic power steering sensor -G250- -1- from steering gear housing.

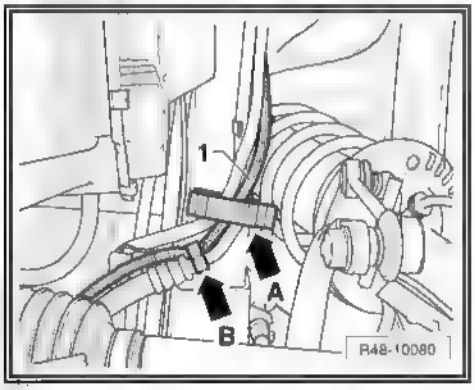


7.4.2 Installation

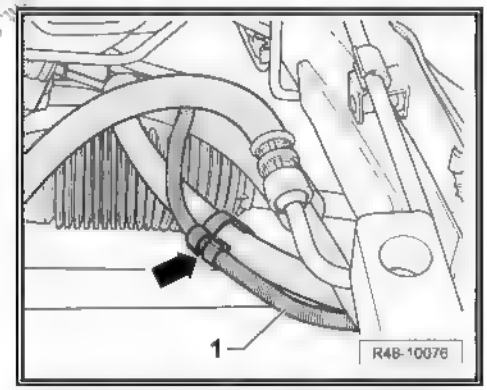
- Install the Electro-hydraulic power steering sensor -G250- to the steering gear housing, and tighten it ⇒ Item 5 (page 153) .
- Connect the connector to the motor/pump set.
- Install radiator vent control unit -1- on the longitudinal member fastening the nuts -arrows- with 6 Nm.



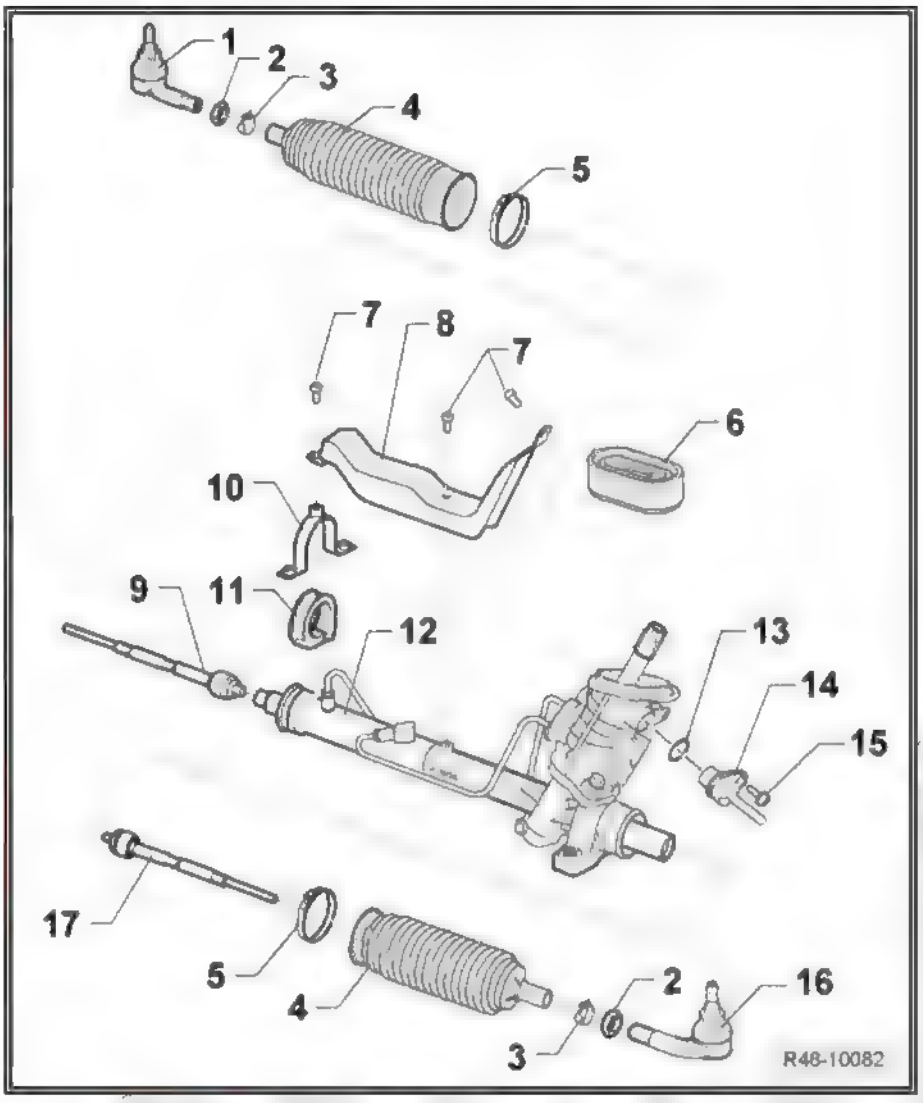
- Install the cable -1- of Electro-hydraulic power steering sensor -G250- on support -arrow B-.
- Close the spacer -arrow A-.



- Install the cable -1- of Electro-hydraulic power steering sensor -G250- on support -arrow-.
- Install the left front wheel case protection. Please refer to manual ⇒ Body - external mountings; Rep. Gr. 66 ; External equipment .
- Fit wheel and tighten screws ➢ page 88 .



7.5 Hydraulic power steering box f⁸ JTEKT - disassemble and assemble



1 - Right steering track rod ball joint
- ❑ marked with "C"
- ❑ check. ⇢ page 168
- ❑ remove from the steering arm
- ❑ note the assembly position ⇒ page 169

2 - Hexagon nut
- ❑ 50 Nm

3 - Clamp

4 - Protection cover
- ❑ must not be twisted after adjusting the alignment
- ❑ You must remove the steering box to replace it

5 - Clamp
- ❑ replace - open with pliers
- ❑ fasten ⇒ page 168

6 - Gasket

7 - Screw
- ❑ 8 Nm

8 - Heat shield

9 - Right steering track rod
- ❑ 80 Nm
- ❑ remove and install ⇒ page 166
- ❑ supplied as a pre-adjusted replacement part
- ❑ align the vehicle after replacing it ⇒ page 89

10 - Clamp with nuts
- ❑ replace if threads are damaged

11 - Rubber bearing

12 - Steering box
- ❑ remove and install ⇒ page 155

13 - Gasket

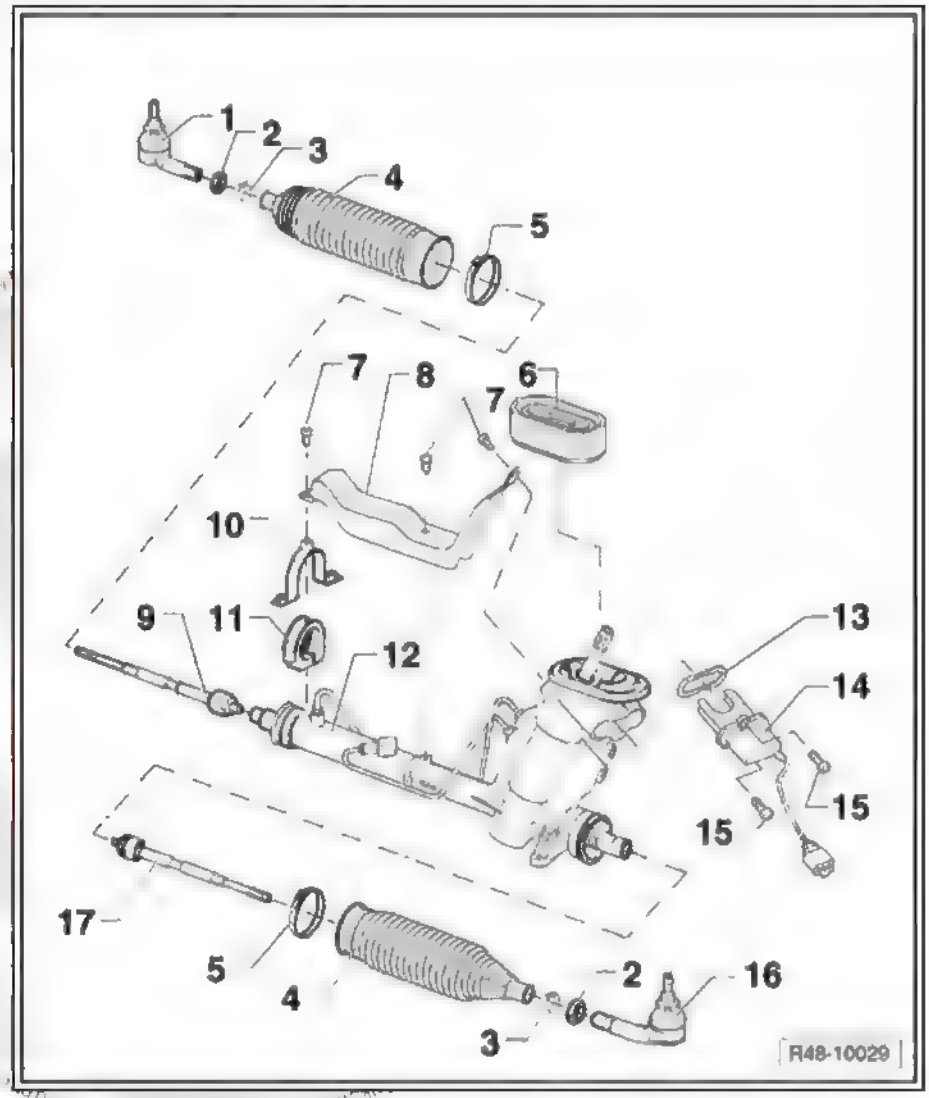
14 - Electro-hydraulic power steering sensor -G250-
- ❑ remove and install ⇢ page 161
- ❑ it can be checked in the function "Assisted Troubleshooting" with Diagnosis, Measurement and Information System -VAS 5051-

15 - Screw
- ❑ 6 Nm

16 - Left steering track rod ball joint
- ❑ marked with "D"
- ❑ check ⇢ page 168
- ❑ remove from the steering arm

17 - Left steering track rod
- ❑ 80 Nm
- ❑ remove and install ⇒ page 166
- ❑ supplied as a pre-adjusted replacement part
- ❑ check length and adjust ⇒ page 167

7.6 Hydraulic power steering box fª TRW - disassemble and assemble



1 - Right steering track rod ball joint
- ❑ marked with "C"
- ❑ check: ⇒ page 168
- ❑ note the assembly position ⇒ page 169

2 - Hexagon nut
- ❑ 50 Nm

3 - Clamp

4 - Protection cover
- ❑ must not be twisted after adjusting the alignment
- ❑ remove the steering box to replace it

5 - Clamp
- ❑ replace: open with pliers
- ❑ fasten ⇒ page 168

6 - Gasket

7 - Screw
- ❑ 8 Nm

8 - Heat shield

9 - Right steering track rod
- ❑ 80 Nm
- ❑ remove and install ⇒ page 166
- ❑ supplied as a pre-adjusted replacement part
- ❑ align the vehicle ⇒ page 89

10 - Clamp with nuts
- ❑ replace if threads are damaged

11 - Rubber bearing

12 - Steering box
- ❑ remove and install ⇒ page 155

13 - Gasket

14 - Electro-hydraulic power steering sensor -G250-
- ❑ remove and install ⇒ page 161
- ❑ it can be checked in the function "Assisted Troubleshooting" with Diagnosis, Measurement and Information System -VAS 5051-

15 - Screw
- ❑ 6 Nm

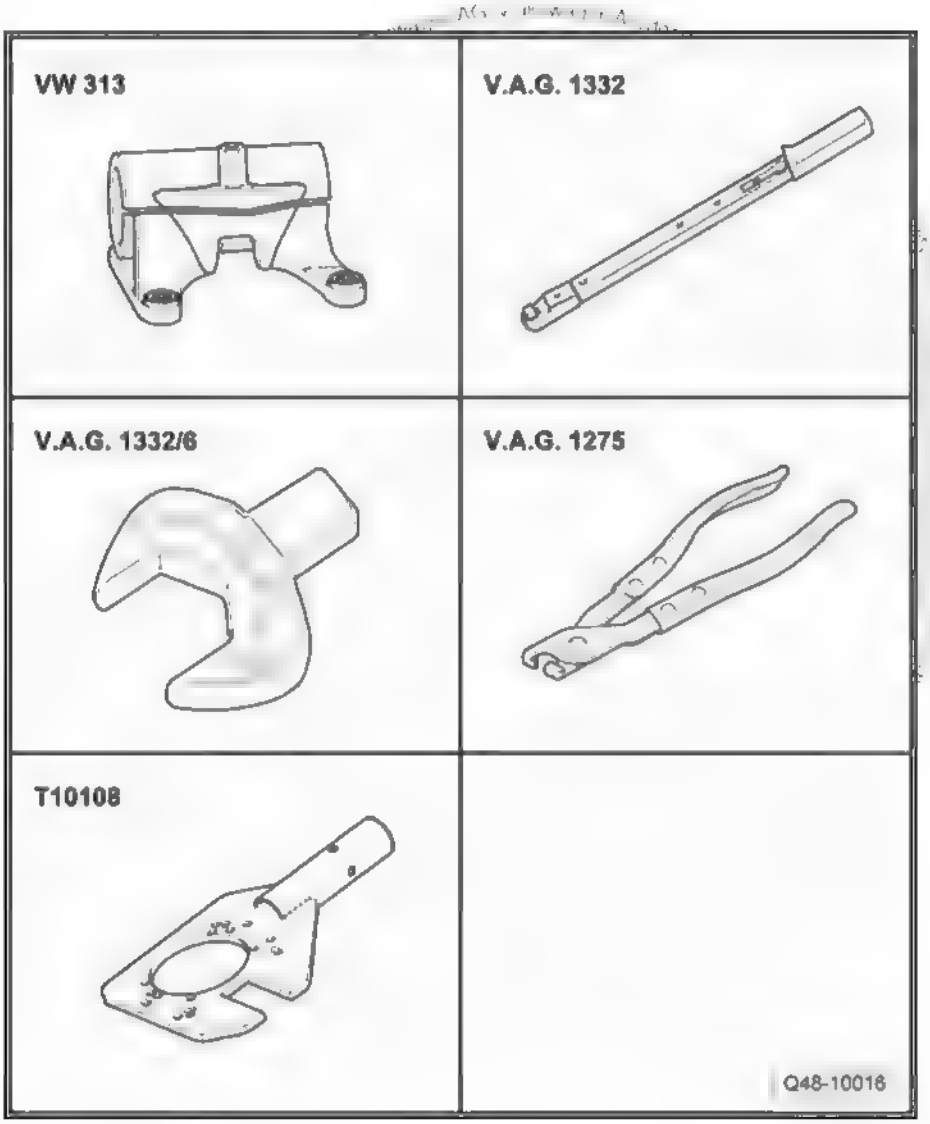
16 - Left steering track rod ball joint
- ❑ marked with "D"
- ❑ check ⇒ page 168

17 - Left steering track rod
- ❑ 80 Nm
- ❑ remove and install ⇒ page 166
- ❑ It is supplied as pre-adjusted spare part
- ❑ check length and adjust ⇒ page 167

7.7 Steering track rod - remove and install

Special tools and workshop equipment required

- Support for VW643 or VW 643/1 -VW 313-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Spanner insert 32 -VAG 1332/6-
- Clamp pliers or VW 004V - VAG 1275-
- Gearbox support -T 10108-



7.7.1 Removal

The steering bars can only be removed and installed with the steering box removed

– Close the steering box tubes in case it was not previously done.

– Clean the steering box on the outer section with the bellows

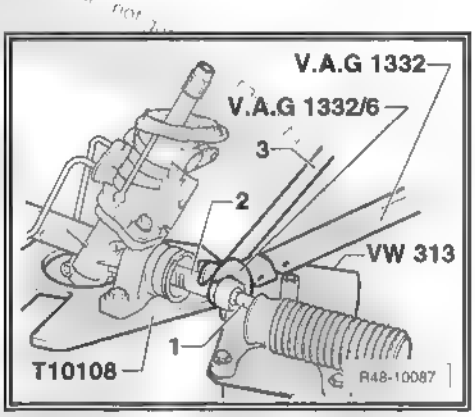
To remove the right steering bar, open the left bellows tightening clamp and push the bellows backwards because it is necessary to press against the left gear rack to release the right steering bar.

– Open the clamp with the Clamp pliers or VW 004V -VAG 1275- and move the bellows backwards

Vehicles with hydraulic power steering f³ JTEKT

– Attach the steering gear housing to Gearbox support -T 10108- and loosen the rod -1- from the gear rack -2-.

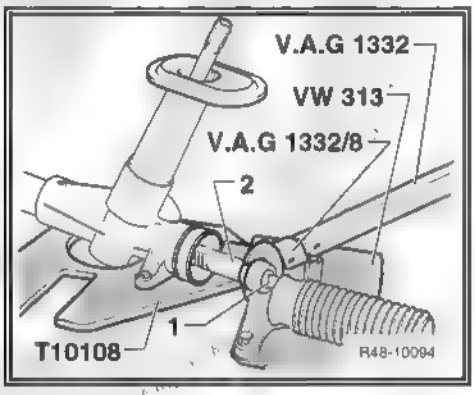
To fasten the steering box, use the hole "5" and the proper gearbox support hole, located on the front.



Vehicles with hydraulic power steering f³ TRW

– Attach the steering gear housing to Gearbox support -T 10108- and loosen the rod -1- from the gear rack -2-.

To fasten the steering box, use the hole "5" and the proper gearbox support hole, located on the front.



7.7.2 Installation

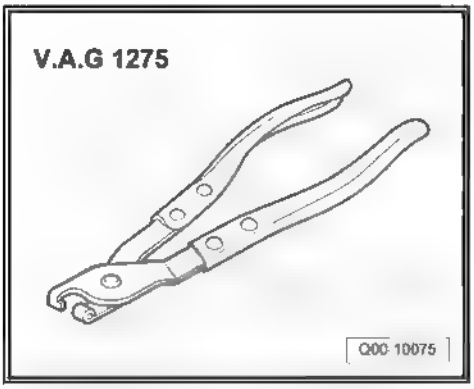
The installation is processed in the reverse order from removal.

Tightening torque:	
Steering bar to steering box	80 Nm

7.8 Left steering bar length - check and adjust

Special tools and workshop equipment required

♦ Clamp pliers or VW 004V -VAG 1275-

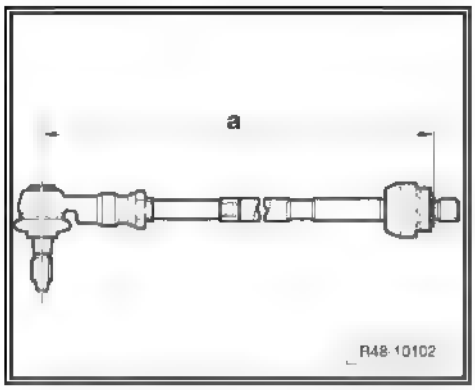


7.8.1 Check

– Check and adjust the left steering bar following the distance if necessary "nd" .

Measurement -nd- = 365 ± 5 mm

Then you must check and, if necessary, adjust the total convergence at the wheel alignment bench; Steering wheel alignment ⇒ page 89 .

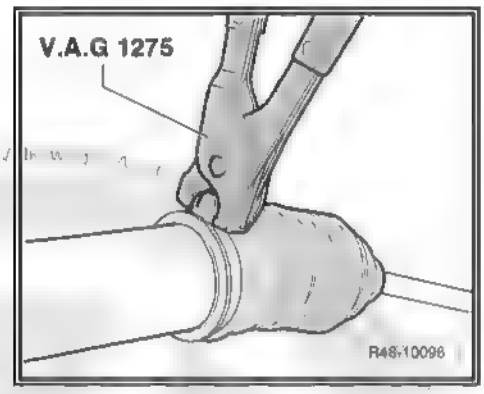


7.8.2 Install the protective caul

– Check the protective caul for wearing (tears, cracks) and make sure that the sealing surfaces are clean.

– When installing the protective caul, turn the steering yoke first so that the bar ball pin gets in the installation position.

– Attach the clamp with Clamp pliers or VW 004V -VAG 1275- .



Note

- *Use only original clamps*
- *Under no circumstances shall the protective caul be installed twisted (misaligned)*

7.9 Clearance, fastening and protective cauls from the steering yoke tips - check

– With the lifted vehicle (wheels hanging free), check the play by moving the steering track rods and wheels. Play: without play.

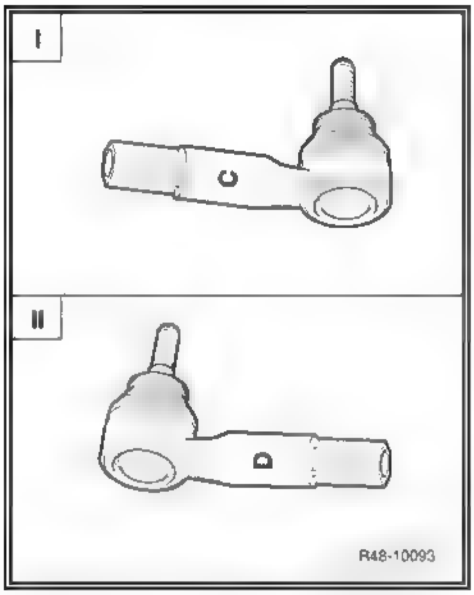
– Check fastening.

– Check the sealing bellows for damages and correct fitting.

7.10 Correspondence of the steering yoke tips

I - The right steering yoke tip is marked with -C-.

II - The left steering yoke tip is marked with -D-.

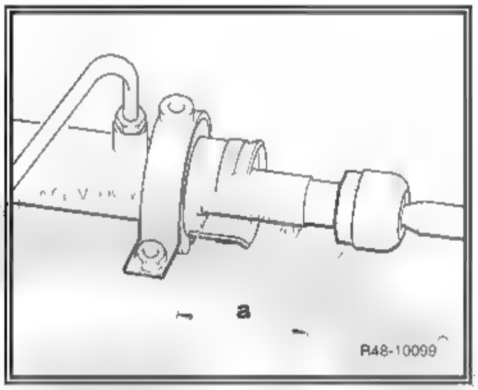


7.11 Gear rack centering - determine

Prior to assembling the steering box, the gear rack shall be placed in central position.

- Move the gear rack to the position where the distance -nd- is reached.

Measurement -nd- = 75.5 mm



8 Hydraulic power steering motor/ pump set (Diesel engines)

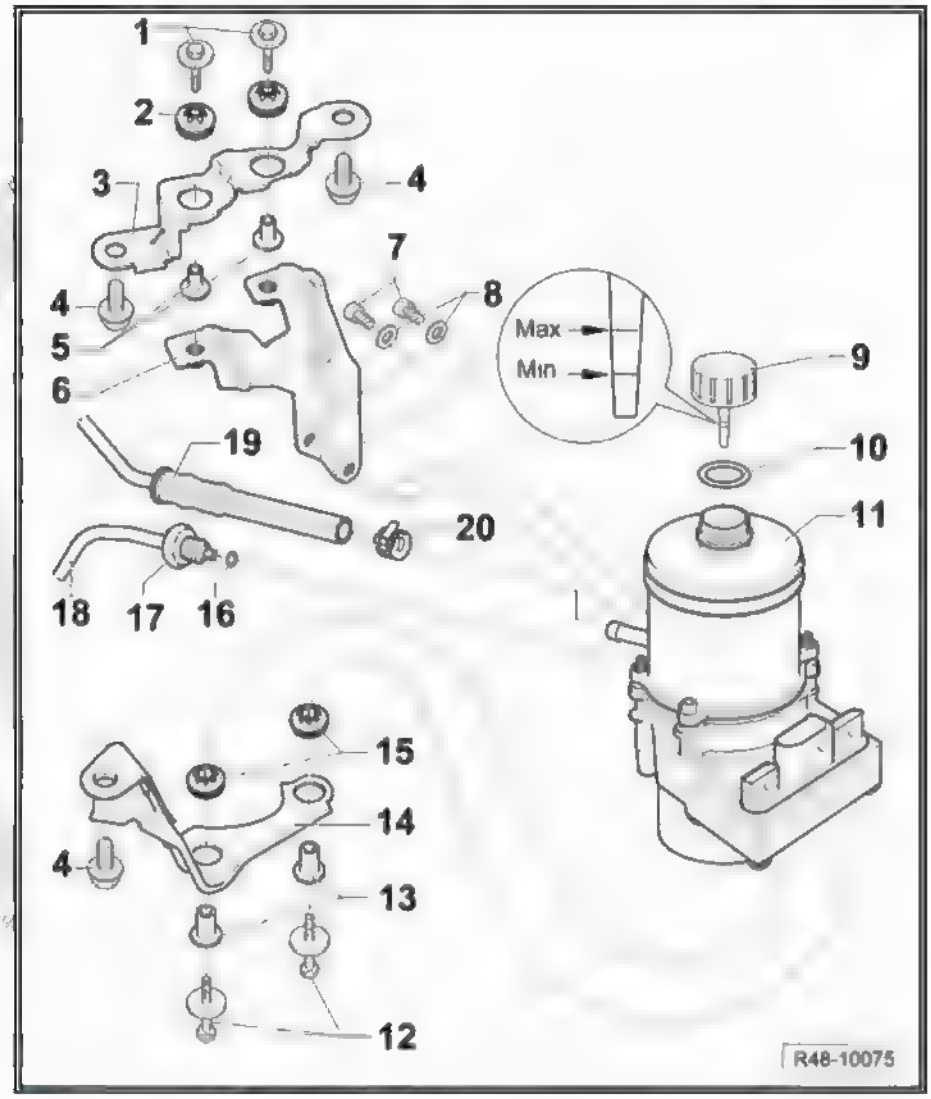
WARNING

Always replace self-locking nuts and screws which were subjected to angular torque.

8.1 Motor/pump set; from JTEKT - assembly overview

Note

- *The motor/pump set must not be repaired*
- *In case of complaints, determine the causes through pressure and tightness tests along with self-diagnosis*
- *If the hydraulic fluid reservoir level is low, check the steering system for leaks*
- *If there are leaks in the hose connection areas, you must tighten and dry them*
- *Do not reuse drained hydraulic oil*
- *Always replace the seal*
- *Filling capacity on the oil system: approx. 0.8 liters*



1 - Hexagon screw
- ❑ 7 Nm

2 - Rubber bearing

3 - Support

4 - Hexagon screw
- ❑ 20 Nm + 90°
- ❑ replace after each removal

5 - Bushing

6 - Support
- ❑ for set/pump

7 - Screw
- ❑ 7 Nm

8 - Shim

9 - Cover with dipstick
- ❑ Check hydraulic oil level ⇒ page 179

10 - Sealant

11 - Engine/pump assembly
- ❑ the repair is not expected
- ❑ remove and install ⇒ page 173
- ❑ check the pressure on the motor/pump set ⇒ page 175

12 - Hexagon screw
- ❑ 7 Nm

13 - Bushing

14 - Support

15 - Rubber bearing

16 - Sealant
- ❑ replace after each removal

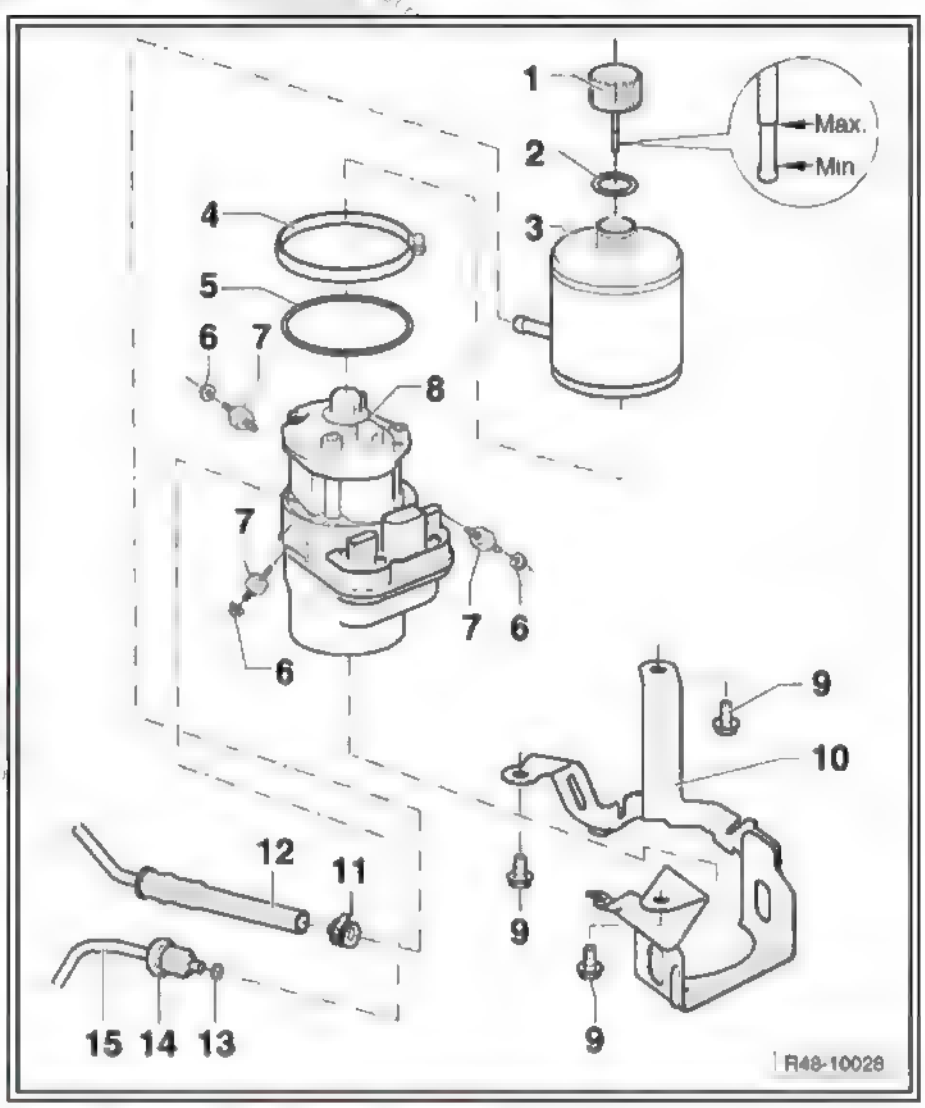
17 - Connecting screw
- ❑ 30 Nm

18 - Pressure hose

19 - Return hose/tube

20 - Spring clamp

8.2 Motor/pump set; fª TRW - assembly overview



1 - Cover with dipstick
- ❑ Check hydraulic oil level ⇒ page 179

2 - Sealant

3 - Expansion tank
- ❑ To remove from the motor/pump set, slightly heat with a hot air blower.

4 - Clamp

5 - Retainer
- ❑ replace after each removal

6 - Hexagon nut
- ❑ 7 Nm
- ❑ By tightening properly on the support, ⇒ Item 7 (page 172) apply counter pressure

7 - Bracket
- ❑ 7 Nm
- ❑ Check if there are damages, tears to the rubber; check the metal plate released from the rubber; replace if necessary.

8 - Engine/pump assembly
- ❑ The repairs are not expected
- ❑ Only the expansion tank can be replaced ⇒ Item 3 (page 172) , the clamp ⇒ Item 4 (page 172) and the retainer ⇒ Item 5 (page 172)
- ❑ Remove and install ⇒ page 173
- ❑ Check the pressure on the motor/pump set ⇒ page 175

9 - Hexagon screw
- ❑ 20 Nm + 90°
- ❑ replace after each removal

10 - Support
- ❑ from the motor/pump set

11 - Spring clamp

12 - Return hose

13 - Retainer
- ❑ replace after each removal

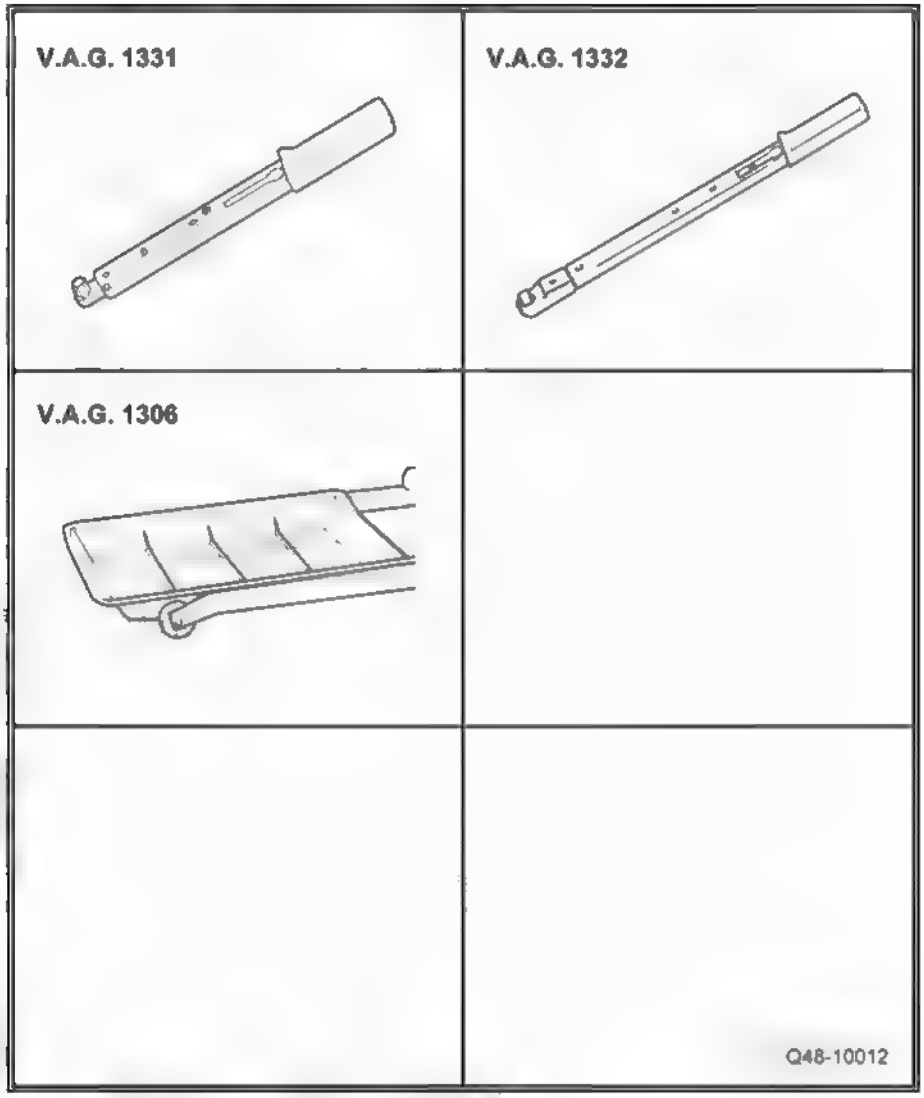
14 - Cap screw
- ❑ 30 Nm

15 - Pressure tube

8.3 Motor/pump assembly - remove and install

Special tools and workshop equipment required

- "Torque wrench - 5 to 50 Nm (socket 1/2")" -VAG 1331-
- "Torquemeter - 40 to 200 Nm (socket 1/2")" -VAG 1332-
- Drip tray -VAG 1306-



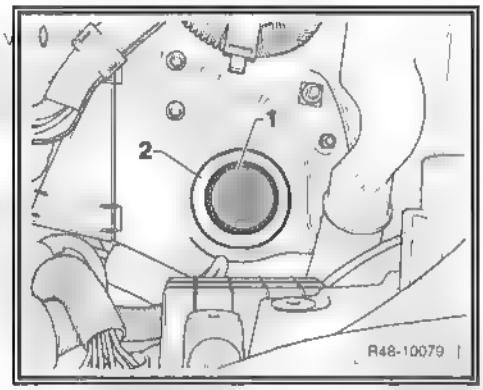
Note

- *The motor/pump set must not be repaired*
- *In case of complaints, determine the causes through pressure and tightness tests along with self-diagnosis*
- *If a fault is determined, replace the motor/pump set*
- *Residual hydraulic fluid remains on the motor/pump set, as well as on the pressure and return hoses, after the fluid is drained*
- *Do not reuse drained hydraulic oil*
- *The pressure and return hoses must not be tightened using, for example, Clamps (diam. 25 mm) -3094- or tools. Tightening may damage the pressure and return hoses*
- *To prevent damages, a radius with curvature lower than 100 mm must be avoided when bending or applying pressure on the pressure and return hoses*

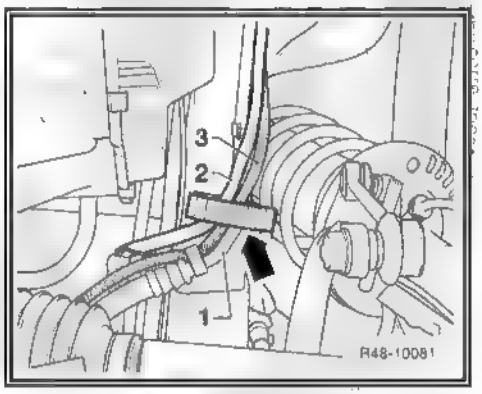
8.3.1 Removal

Check if a code radio is installed. If this is the case, request the anti-theft code.

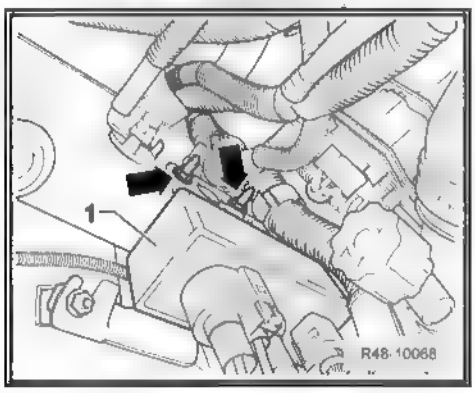
- Remove the battery and the battery support Please refer to manual ⇒ Electrical system; Rep Gr. 27 , Starter, alternator, battery .
- Remove cover -1- from engine/pump assembly -2-
- Remove as much hydraulic oil from the motor/pump set as possible, with the help of a suction bottle.
- Remove the left front wheel.
- Remove left front wheel box protector. Please refer to manual ⇒ Body - external mountings; Rep. Gr. 66 ; External equipment .
- Remove the noise insulation. Please refer to manual ⇒ General body repairs, exterior; Rep. Gr. 50 ; Body - Front part .



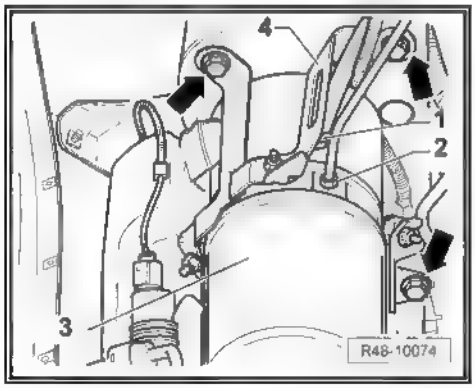
- Open the clamp -arrow-.
- Remove the pressure and return hoses-1- and -2- from the clamp.
- Remove the cable -3- of Electro-hydraulic power steering sensor -G250- from spacer.



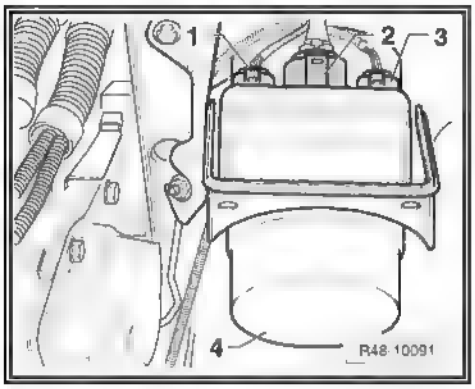
- Remove radiator vent control unit -1- of sill -arrows-.



- Open the return hose clamp -1- and remove from the motor/pump set connection return duct.
- Remove the pressure duct -2- from engine/pump assembly -3-.
- Seal the motor/pump set threaded holes with plastic plugs, for example.
- Seal the pressure hose, return hose and connections of the engine/pump assembly with plastic bag and adhesive tape.
- Remove screws -arrows- and slightly lower the motor/pump set along with the support.



– Pull off connectors -1-, -2- and -3- from engine/pump assembly -4-.
– Remove the motor/pump set along with the support.



8.3.2 Installation

Note

- *Use new seal for the duct/hose connections*
- *Make sure that the sealing surfaces are clean*

The installation is performed in the reverse order from removal.

– Activate the radio code.
– Top up with new hydraulic oil, using a funnel and a hose of approx. 400...500 mm.

Using Hydraulic Oil -G 004 000 M2- . Refer to the ⇒ Chemical material manual

– Bleed steering system ⇒ page 177 .
– Check hydraulic oil level ⇒ page 179 .

Tightening torque:

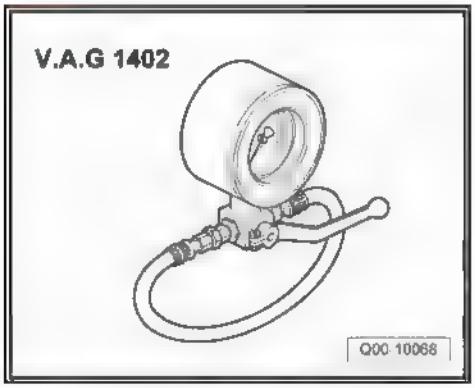
Motor/pump set support to body ⇒ Item 4 (page 171) .

Pressure pipe to motor/pump assembly ⇒ Item 17 (page 171) .

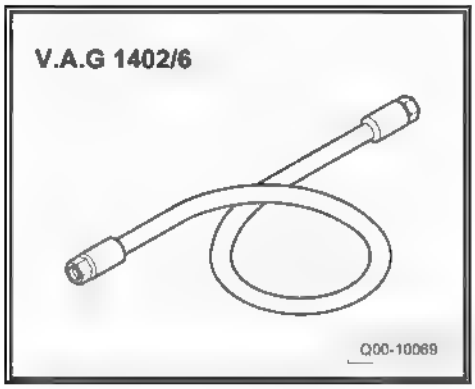
8.4 Motor/pump set pressure; fª JTEKT - check

Special tools and workshop equipment required

- Power steering control equipment -VAG 1402-



♦ Adapter -VAG 1402/6-



♦ Adapter -VAG 1402/13-

♦ Adapter -VAG 1402/14-

Check if a code radio is installed. If this is the case, request the anti-theft code.

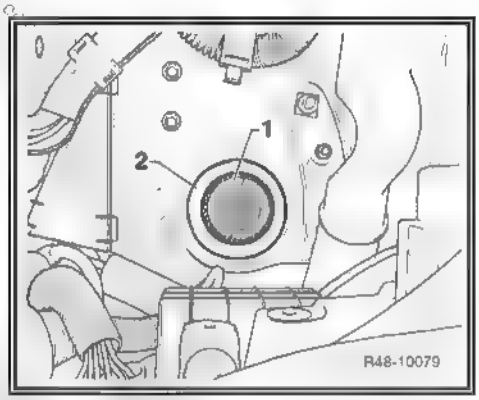
– Disconnect the Battery -A- and remove the console from the Battery -A- ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .

– Remove the cover -1- from engine/pump assembly -2-.

– Remove as much hydraulic oil from the pump as possible, with the help of a suction bottle.

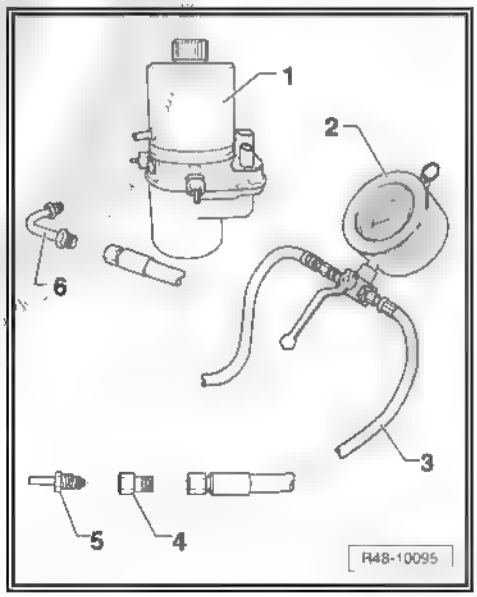
– Remove the engine noise insulation. Please refer to manual ⇒ General body repairs, exterior; Rep. Gr. 50 ; Body - Front part .

– Remove the pressure tubes from the motor/pump set.



– Assemble the adapters as indicated in the illustration.

1 - Motor/pump set
2 - Power steering control equipment -VAG 1402-
3 - Adapter -VAG 1402/6-
4 - Adapter -VAG 1402/14-
5 - Pressure tube
6 - Adapter -VAG 1402/13-



Note

Pay attention to the pressure gauge handle position, because it must be on the position -2-

– Fill with hydraulic fluid and check the level ⇒ page 179 .

– Bleed the steering system ⇒ page 177 .

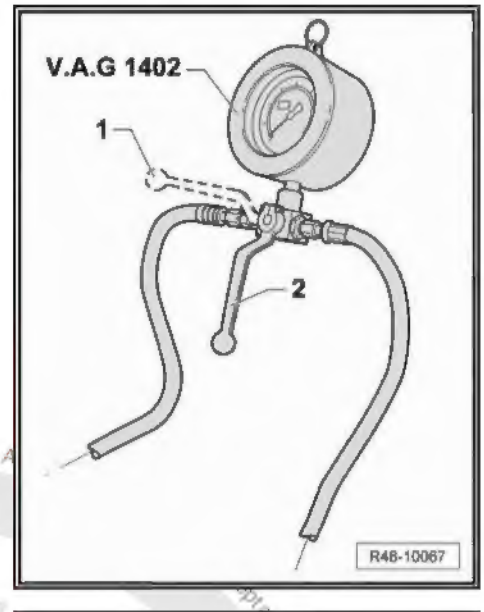
– Test the distribution pressure now.

Checking condition:

- System tightness
- The flexible tubes/cables are not bent or strangled.

– Start the engine.

– Turn the steering wheel fully to a side.

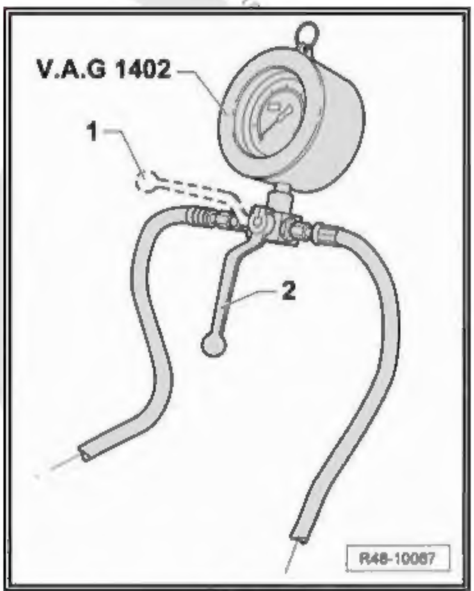


– With engine idling close tap for 5 seconds at the most (position -1-) and read the pressure.

Nominal pressure value:

90…105 bar

If the nominal value is not reached, replace the motor/pump set ⇒ page 173 .



Completely turn the steering by means of the steering wheel until the stop, immobilize it and, with the blocking valve in the position -2-, read the pressure.

If the value measured is clearly lower than the first one, there is leakage in the steering box.

– Disassemble the pressure gauge and adapter.

– Assemble the pressure tubes from the motor/pump set.

– Fill with hydraulic fluid and check the level ⇒ page 179 .

– Bleed the steering system ⇒ page 177 .

– Check the hydraulic fluid level and replenish, if necessary ⇒ page 179 .

– Test the leak-proofness of the steering system ⇒ page 178 .

– Install the engine noise insulation. Please refer to manual ⇒ General body repairs, exterior; Rep. Gr. 50 ; Body - Front part .

Tightening torque:	
Pressure tube to the motor/pump set [4]	30 Nm

4) Use new retainer.

8.5 Steering system - bleed

– Remove the left front wheel.

– Remove left front wheel box protector. Please refer to manual ⇒ Body - external mountings; Rep. Gr. 66 ; External equipment .

– Check hydraulic oil level and fill it up if necessary ⇒ page 179 .

- Lift the vehicle until the front wheels are free.
- Turn the steering wheel from stop to stop 10 times with the engine stopped.
- Check hydraulic oil level and fill it up if necessary ⇒ page 179 .
- Release the hydraulic oil reservoir cover. Do not tighten.
- Run the engine for 10 seconds and then stop it.
- Check hydraulic oil level and fill up, if necessary ⇒ page 179 .
- Release the hydraulic oil reservoir cover. Do not tighten.
- Repeat the work sequence below until the hydraulic oil level no longer lowers:
- Start the engine.
- Turn the steering wheel 10 times from stopper to stopper.
- Stop the engine.
- Check hydraulic oil level and fill it up if necessary ⇒ page 179 .
- After the bleeding procedure is concluded, tighten the motor/ pump set reservoir lid manually.

8.6 Leak-proofness of the steering system - check

Note

If after the repair the hydraulic oil level on the reservoir is still low, you must obligatorily check the hydraulic power steering system for leaks

- Remove the left front wheel.
- Remove the noise insulation. Please refer to manual ⇒ General body repairs, exterior; Rep. Gr. 50 ; Body - Front part .
- Remove left front wheel box protector. Please refer to manual ⇒ Body - external mountings; Rep. Gr. 66 ; External equipment .
- Run the engine at idle speed.
- Turn the steering wheel on both sides until obtaining stopper. Keep it in this position on each side for 5 to 10 seconds. The maximum pressure possible will be produced.
- Check the hoses and return hoses for leak proofness.
- Check all tubes and hose connections for correct seating and leak proofness. When the tubes and hoses are leaking, tighten the connections to the torque specified or replace the sealing or the piping/hose.
- Check the engine/pump assembly for leak proofness. In case of leak, replace it.
- Check the hydraulic oil reservoir for leakages. On vehicles with a JTEKT motor/pump set, if the reservoir leaks, the motor/ pump set must be replaced.
- Check the hydraulic fluid level and replenish, if necessary ⇒ page 179 .

Note

If the hydraulic oil level in the reservoir lowers, even with the pipes/hoses and or pressure duct connections without leaks, the hydraulic power steering box may be the cause for the hydraulic oil loss. In this case, the hydraulic power steering box must be checked, after being removed from the vehicle

– Remove the hydraulic power steering box ⇒ page 155 .

Check the following parts for leakages with the steering box removed:

- Steering box valve body pinion seal
- All connections from the steering box tubes

For the next phases, pull the protective cauls away:

– Open the protection cover clamps.

– Remove the protection cover. The steering box must be replaced if the hydraulic oil is visible on the steering box body and/or on the protective cauls.

– Install the hydraulic power steering box ⇒ page 158 .

– Install the left front wheel case protection. Please refer to manual ⇒ Body - external mountings; Rep. Gr. 66 ; External equipment .

– Install the left front wheel and tighten the screws ⇒ page 88 .

8.7 Oil level - check

– Disassemble the air filter case, if necessary.

– Remove the battery and the battery support. Please refer to manual ⇒ Electrical equipment; Rep. Gr. 27 ; Starter, alternator, battery .

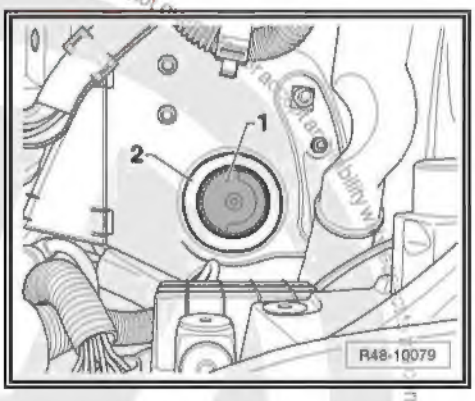
– Remove the reservoir lid -1- from engine/pump assembly -2-.

– Clean the oil dipstick with a clean cloth.

– Manually press the cover, loosen it again and check the oil level.

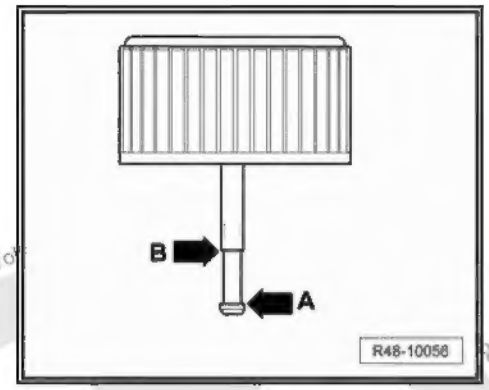
Completely press the cover in order to obtain an accurate fluid level reading.

– Do not start the engine and leave the wheels in straight line position.



– Check the oil level.

The oil level must be between the lower mark -arrow A- and upper mark -arrow B- of oil dipstick.



Note

- *If oil level is above mark -arrow B-, it is necessary to drain the excessive oil*
- *If the oil level is below the indicated area, the hydraulic system must be checked for leaks (check the hydraulic power steering system tightness) ⇒ page 178). It is not enough to simply replenish the oil level*
- *Do not reuse the hydraulic oil after draining it*
- *Using Hydraulic Oil -G 004 000 M2- to replenish. Refer to the⇒ Chemical material manual*

– If it is proven that the hydraulic system does not have leaks, you must replenish the hydraulic oil level.

– Tighten the motor/pump set reservoir lid manually.

05.11